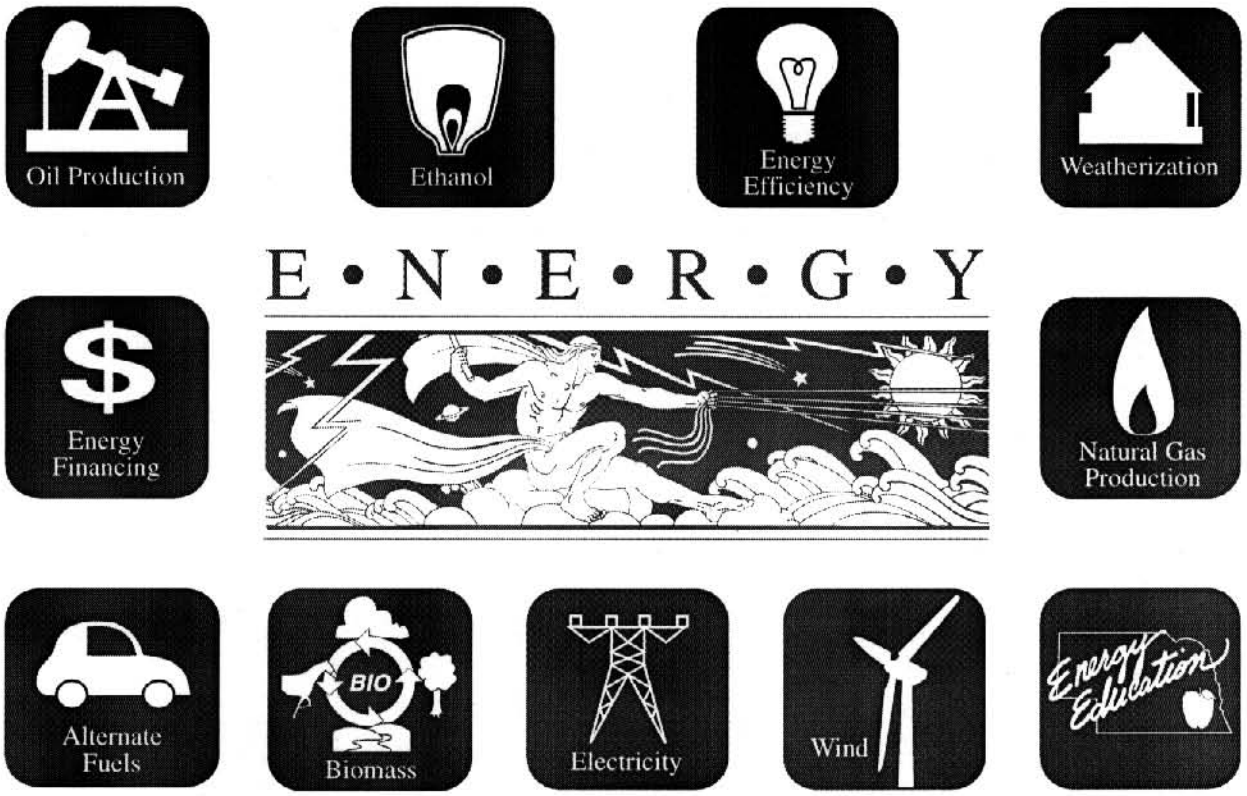
Nebraska Energy Office
1998 Annual Report
with Energy Statistics Update



STATE OF NEBRASKA

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E. Benjamin Nelson
Governor

December 28, 1998

Dear Nebraskans:

In previous *Annual Reports*, the Energy Office highlighted various aspects of the multi-faceted work it performs: alternate fuel production and promotion, especially ethanol; low-interest Dollar and Energy Saving Loans to Nebraskans; oil overcharge funded activities; and Nebraska's and the nation's growing reliance for its petroleum needs from increasingly unstable areas of the world.

However, examining the activities of the Nebraska Energy Office over the past fiscal year, one fact becomes very clear when looking at the "big picture" — housing-related energy efficiency activities, including new construction, remodeling and weatherization, have over the past several years evolved into a significant part of the agency's work. In 1996, a study of Nebraska's housing needs found that by 2000, an estimated 35,000 more affordable homes would be needed. Another fact is that nearly one-third of homes in Nebraska are 60 years or older. One way to make houses affordable is to reduce energy costs through energy efficiency improvements. Agency loans and other services can keep the state's housing an asset and help close Nebraska's housing gap.

In just the last year, the Energy Office was responsible for:

- Almost $6.3 million invested in constructing new energy efficient homes,
- Another $8.6 million in low interest loans financed the installation of new furnaces, air conditioners, windows, siding, roofs, insulation and other energy improvements in homes and
- $2.7 million was invested in energy saving improvements in the homes of lower income Nebraskans.

Taken together, nearly 2,800 homes in Nebraska have benefited from almost $16.7 million in low-cost financing and other services offered by the Energy Office in 1997-1998. The state's banks, savings and loans, credit unions and borrowers provided $7.3 million in financing for these housing projects.

For the past three years, the Energy Office has won six competitive federal housing-oriented grants totaling $1.15 million which has further enhanced the agency's ability to offer services and expertise to the state's builders, realtors and local housing officials.

The agency has also reached several other milestones in its long-running success story: Dollar and Energy Saving Loans. As of the end of 1998, the Energy Office has surpassed the 15,000th loan mark and financed projects totaling $100 million. All this was accomplished in a little more than eight years, making Nebraska a national leader in financing housing and home improvements.

One final fact cannot be overlooked: since 1983, no state general funds have supported the Energy Office.

A complete survey of the agency's activities, past and current energy trends and relevant Nebraska energy use statistics can be found in the pages of the *1997-1998 Annual Report*. It is with pleasure that I present this *Report* to you.

Sincerely,

E. BENJAMIN NELSON
Governor

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Part II — State and National Energy Trends

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This *Annual Report* is for the period July 1, 1997, through June 30, 1998, except where noted.

Weatherization Division

The Weatherization Division administers the Low Income Weatherization Assistance Program — a federally-funded program for weatherizing homes to save money and energy. The Energy Office is responsible for inspecting about 21 percent of the homes — about 276 — that are weatherized and for monitoring and auditing the subgrantees, primarily community action agencies, that actually make the home weatherization improvements.

Weatherization Funding Sources, 1979-1998

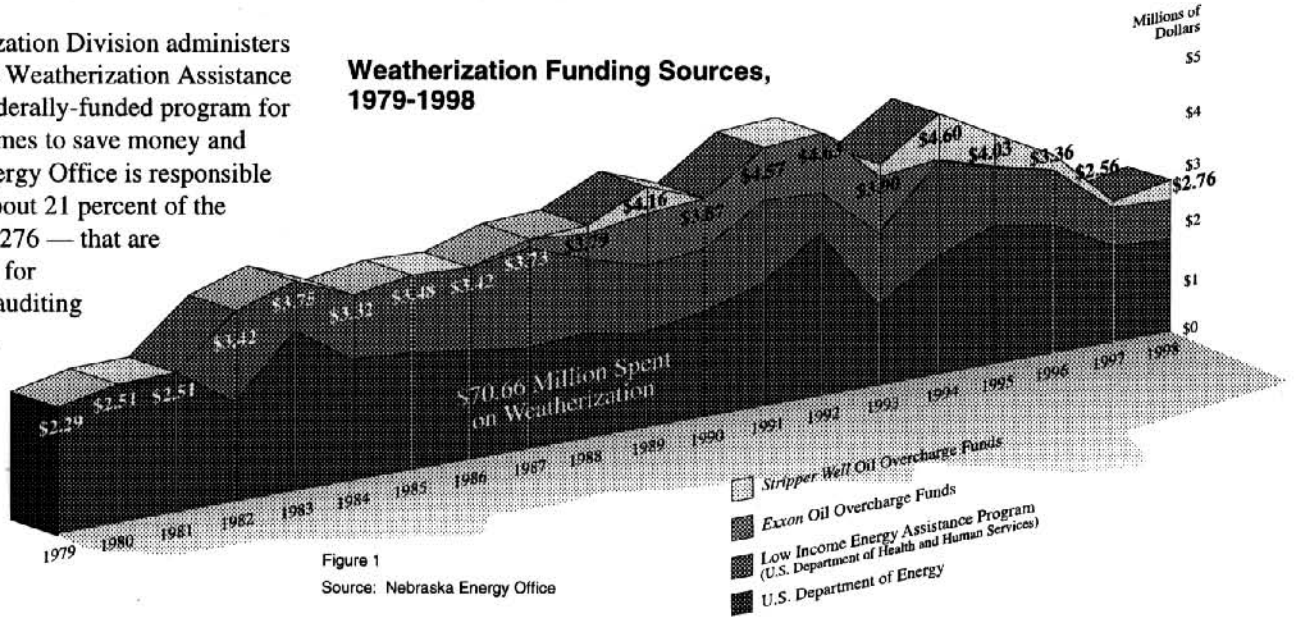


Figure 1
Source: Nebraska Energy Office

1997-1998 Highlights

In 1997-1998, total funding for the program was $2,760,909. The Department of Energy's Low Income Weatherization Assistance Program provided a total of $1,320,499 and the Low Income Home Energy Assistance Program, administered through the Nebraska Department of Health and Human Services, supplied a total of $1,286,126. The balance of the funding — $154,284 — came from the *Stripper Well* oil overcharge trust account.

Total funding for this activity increased by more than seven percent from the previous year. Decreases in funding from the federal Department of Energy were offset by funding increases from the U.S. Department of Health and Human Services and oil overcharge funds. The only overcharge funds remaining to be used by the Weatherization Assistance Program are *Stripper Well* monies. Figure 1 shows the funding amounts and sources since the program began in 1979.

19 Years of Helping Nebraskans

Since the Low Income Weatherization Assistance Program began operation in the state in 1979, more than $70.66 million in federal and oil overcharge funds have been spent to weatherize the homes of low-income elderly, disabled and others.

In the past 19 years, 48,327 homes have received free weatherization (see figure 2). However, an estimated 60,000 Nebraska homes remain eligible for this service.

Number of Homes Weatherized by Sources of Funds, 1979-1998

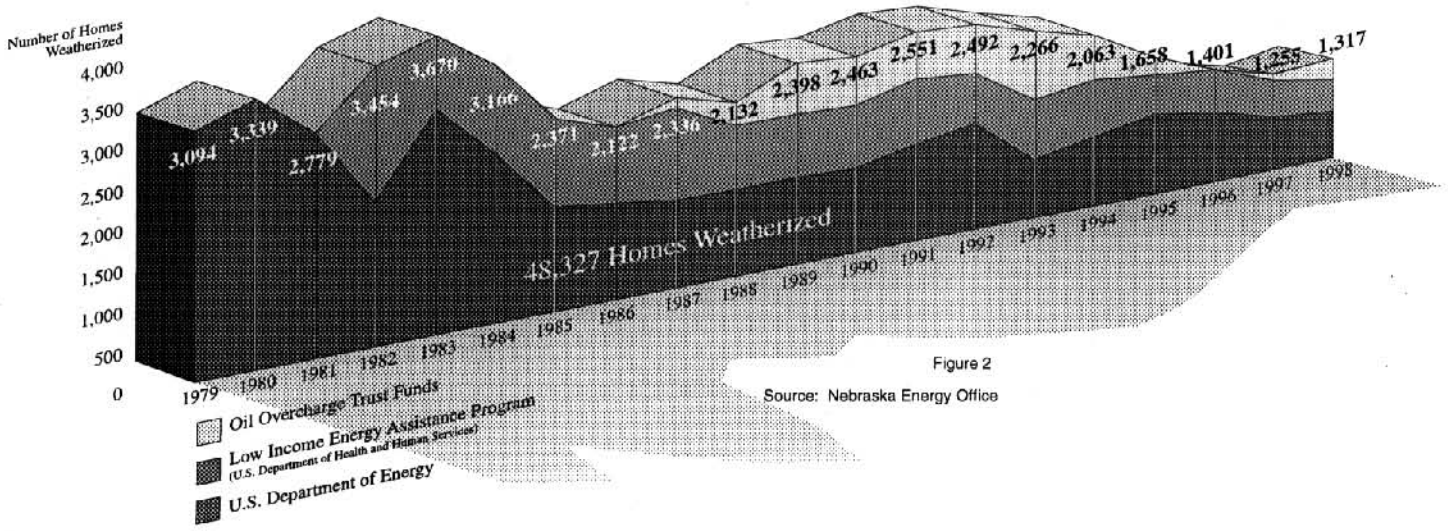
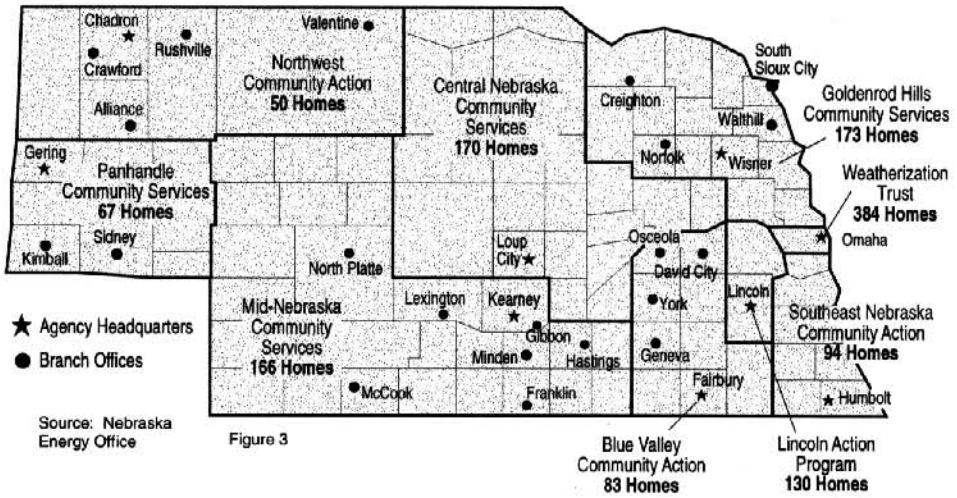


Figure 2
Source: Nebraska Energy Office

Nebraska Weatherization Assistance Program Service Areas and Homes Weatherized, July 1, 1997 - June 30, 1998



Source: Nebraska Energy Office

Figure 3

Homes Weatherized in 1997-1998

A total of 1,317 homes, were weatherized in fiscal year 1997-1998. In keeping with the agency's priority to serve Nebraska's elderly community through the Low Income Weatherization Assistance Program, the division weatherized 451 elderly households, or more than 34 percent of all homes improved during this period.

The map, figure 3, shows the nine Weatherization Assistance Program service areas and the number of homes weatherized in each area from July 1, 1997, through June 30, 1998.

Home improvements made through the program saved Nebraskans a total of more than $188,331 in avoided energy costs during 1997-1998. The home improvements represent a one-time investment that most likely will yield a rate of return for at least twenty years.

Other Oil Overcharge Projects

In late 1995, the agency converted the Weatherization Assistance Program Loans for landlords unable to pay one-half the cost of the improvements to Weatherization Energy Efficient Mortgages for soon-to-be home buyers.

These new mortgages are limited to those families with incomes ranging from $12,075 for a family of one to $41,475 for a family of eight. The below-market-rate mortgages allow prospective home buyers to make necessary energy-saving home improvements without raising the cost of the monthly mortgage payment.

Funds to capitalize the Weatherization Energy Efficiency Mortgages came from two sources: $100,000 from funds for Weatherization Assistance Program Landlord Loans — $50,000 from a 1991-1992 U.S. Department of Energy incentive grant and $50,000 in *Exxon* oil overcharge funds — and $58,823 from a one-time federal Department of Energy grant received in 1995-1996 that distributed previously uncommitted weatherization funds to the states.

Since these mortgages became available, one loan for $3,070 has been made.

Energy Savings A Reality

In August 1996, the agency completed the most extensive evaluation ever of the energy and dollar savings — including reductions in greenhouse gases — resulting from improvements made in the homes of needy Nebraskans by the Weatherization Assistance Program.

The evaluation found that the typical home saved an average of 18.7 percent on energy used for heating and resulted in a reduction of $126 annually in utility bills.

A similar national study using 1989 information showed annual average energy savings of 13.5 percent and $116 in each home.

The 1996 Nebraska findings range from 50 to nearly 100 percent higher than the 1989 national average for energy savings. Because the cost of energy in Nebraska is cheaper than many other areas of the nation, average dollar savings are only 15 percent above the national average.

The typical home's emissions savings, resulting from reduced energy use, averaged 2,297 pounds of carbon dioxide, less than one-half pound of sulfur dioxide and nearly 3/4 of a pound of nitrogen oxides.

Aggregate savings from the 3,700-plus homes improved in the two years of the study resulted in annual energy savings of 77.5 trillion British thermal units and an 18.7 percent overall reduction in energy use in the homes. The first year's dollar savings from all the homes in the study from reduced energy bills totaled $468,064.

Annual greenhouse gas reductions for all the houses totaled 4,284 short tons of carbon dioxide, 1,619 pounds of sulfur dioxide and 2,627 pounds of nitrogen oxides.

The evaluation examined a sample of the homes that received free weatherization services in 1993 through 1995.

Energy Projects Division

The Energy Projects Division is responsible for administering the federally-funded State Energy Program created under the *Energy Policy Conservation Act* of 1975. The program allows the state to use its discretion in providing energy efficiency services, but the Energy Office must submit an annual plan to the U.S. Department of Energy for review and approval.

In general, agency staff operates the program directly. Occasionally, the agency may work closely with outside contractors hired to perform specific projects. The Division is also responsible for preparing the *Nebraska Energy Statistics*, the agency's *Annual Report* and the *Nebraska Energy Quarterly* newsletter.

State Energy Program

Since the inception of the State Energy Program, the federal government has granted funds on an 80/20 matching basis to the states. In 1997-1998, Nebraska received $332,700 in federal funds which were matched with $66,540 in state severance tax funds.

Beginning in 1996, the U.S. Department of Energy began offering discretionary, competitive grants to the states for work in selected areas. In the fall of 1997, the Energy Office received $355,510 for multi-year efforts to expand the agency's work to increase energy efficiency with commercial businesses, multi-family housing groups, building contractors and realtors in the state (More information on these grants appears on pages 4-6). Nebraska ranked as the seventh largest recipient out of those states that applied for these competitive grants.

In 1997-1998, State Energy Program projects included:

- Federally-mandated projects
- Oil overcharge project management
- Energy shortage management and emergency preparedness
- Education and information
- Special Projects including Building Codes, Climate Wise, Rebuild Nebraska and Federal Energy Management Program/Energy Guard.

Federally-Mandated Projects

According to the *Energy Policy Conservation Act*, the Energy Office must undertake mandatory projects in the specific areas of procurement, transportation, lighting standards, thermal standards and right-turn-on-red. Nebraska satisfied the right-turn-on-red mandatory in 1973 when the Legislature passed both right-turn-on-red and left-turn-on-red legislation. The minimum mandatory requirements were also satisfied in 1980 when the Legislature passed thermal efficiency standards, lighting efficiency standards and procurement procedures for state government. The Energy Office also coordinates and publishes a rideshare roster for state employees seeking to carpool. About 100 state workers are listed on the roster from communities surrounding Lincoln.

Oil Overcharge Project Management

Exxon Oil Overcharge projects are managed as State Energy Program projects (see pages 5-10 for a full description of projects financed by oil overcharge funds).

Education and Information Services

Education and information services are needed by consumers to make sound energy decisions.

To support this need, the agency published and distributed the *Nebraska Energy Quarterly* newsletter to thousands of Nebraskans. The *Quarterly* highlights a variety of energy efficiency projects and topics. Two mandated state activities, production of an *Annual Report* and compiling *Nebraska Energy Statistics*, were also maintained. During the reporting period, the *Quarterly* and *Statistics* were also available from the agency's web site. The agency has also actively promoted the use of Internet-based information services developed by the U.S. Department of Energy and others.

Energy Shortage Management and Emergency Preparedness

As part of the agency's energy shortage and emergency activities, the Energy Office routinely monitors fuel supplies and potential disruptions. Monitoring is more intense during times when seasonal demands are high because of sudden weather changes. Contingency plans developed in prior years provide the structure for any necessary energy emergency activities.

Special Projects

Beginning in 1996, the federal Energy Department began competitions for state activities in selected areas. Since that first competition, the Energy Office has garnered $370,000 for three 1996 projects — Climate Wise, Rebuild Nebraska and Energy Guard; $355,510 for two 1997 projects — Rebuild Nebraska and Building Codes; and $550,000 for three 1998 projects — financing incentives for new home construction, Rebuild Otoe County and Home Energy Rating System. Some of the projects are multi-year and complement one another. In less than three years, almost $1.3 million has been added to energy efficiency efforts in the state.

Nationally, the Energy Office has ranked within the top 10 in terms of the total amount of funds awarded to Nebraska in each of the three competitions. The specific activities for each project are summarized in this section. Generally, agency activities on these projects fall into two distinct categories: making existing buildings more energy efficient and finding ways to make new buildings, primarily homes, more energy efficient.

- **Building Codes.** This 1997 grant of $255,500 was to create a non-traditional approach to encourage Nebraskans to construct more energy efficient buildings. During the reporting period, the agency devoted considerable time to get other organizations to adopt the 1995 Model Energy Code as the standard for energy efficiency in rehabilitation of existing homes and construction of new homes.

  By June 1998, the state's Economic Development Department and the U.S. Department of Agriculture Rural Development had adopted these standards for their affordable housing programs.

  Agency staff also provided information and technical expertise and reviewed building plans for the Technical Assistance Review Process team which reviews and recommends funding of joint state affordable housing projects. The Process team is comprised of representatives from federal and state housing agencies.

  Two hundred thousand dollars in oil overcharge funds were used to leverage $1 million from private lenders for the construction of five homes that will exceed the 1995 Model Energy Code by 30 percent or more.

  To date, the agency has spent $16,426 of the original grant.

- **Climate Wise.** Climate Wise is a national effort to help manufacturers willing to voluntarily make energy efficiency and pollution prevention

  improvements. In total, the agency received two multi-year grants totaling $100,000 for the effort, of which $50,000 preceded the Special Projects competition. During the reporting period, work concluded on the first $50,000 grant. By June 1998, Nebraska had recruited 26 voluntary Climate Wise partners. To date, the Energy Office has spent $85,532 from the two Climate Wise grants.

  Work during the reporting period included: coordinating Industrial Assessment Center Audits; organizing a seminar for food processors on how their operations could benefit from advanced technology and lowered operating costs; assisting the Department of Environmental Quality develop plans for source reduction; and investigating a pilot U.S. Environmental Protection Agency plan to combine all voluntary federal government environment and energy programs — including Climate Wise — into a coordinated outreach effort.

- **Energy Guard.** This $70,000 grant was for a two-year effort to assist the Nebraska Military Department identify energy saving and renewable energy options in their buildings and operations. The Military Department selected 44 buildings for energy assessments. Utility bills on the buildings were gathered and on-site inspections by staff, student interns and two private contractors were conducted. Reports on each building analyzing energy use and recommending cost-effective improvements were begun. To date, $60,587 has been spent for Energy Guard activities. The Energy Guard project will be completed during the next reporting period.

- **Home Energy Rating System.** The $50,000 grant enables the Energy Office to create a Home Energy Rating System in Nebraska. A home energy rating system is a measurement of a house's energy efficiency. Rating systems allow buyers to easily compare energy costs for homes being considered. A homeowner can also use the ratings to pinpoint the most cost-effective energy saving improvements. This grant was received in April 1998 and activity was planned to begin during the next reporting period.

- **Financing Incentives for New Home Construction.** This $400,000 grant was received in April 1998 and built on a 1997 building codes grant. The project will leverage an additional $400,000 in private funds from lenders to finance an estimated 750 new affordable homes constructed to exceed the 1995 Model Energy Code by 30 percent. Once the original loans are repaid, these grant funds will become available to finance additional new homes. Activity on this project will begin in July 1998.

- **Rebuild Nebraska.** This multi-year effort was financed with two grants totaling $350,000. Under Rebuild, the agency helps voluntary multiple-family housing and commercial business partners to increase energy efficiency and reduce energy costs in existing buildings. The agency offers partners free assessments of energy use in their buildings and access to low-interest financing for making improvements.

  Throughout the reporting period, agency staff, complemented by university student interns, recruited commercial, utility and housing partners, performed assessments of energy use in buildings, compiled lists of potential cost-effective improvements and provided information on how the improvements could be financed.

  As part of the partner recruitment process, the agency appeared at numerous gatherings to present specifics on Rebuild Nebraska.

  One of the key barriers to making energy efficiency improvements can be access to affordable financing. Under Rebuild Nebraska, the agency attempts to eliminate this barrier where possible by extending access to low-interest Dollar and Energy Saving Loans for larger commercial ventures. The agency also provides a customer-specific listing of financing options available to each partner. An outgrowth of the gathering of the financial options process was the publication of *Ways to Finance*

Your Improvements, a compilation of more than 30 federal, state and local financing options. The financing handbook was featured at the national Rebuild America conference and is considered a national model. An updated second edition is planned for late 1998.

> "The Energy Office is a valuable resource. They have the technical expertise and know of the latest improvements in energy efficiency."
>
> Pat McElhose
> Administrator
> Midwest Covenant Home, Stromsburg
> October 13, 1997

One unique aspect of Rebuild Nebraska is its utility partnerships, such as the partnership with Nebraska Public Power District. The District has become a key player in the recruitment of new Rebuild Partners by devoting staff and time in targeted communities. In 1997-1998, the utility provided assistance in recruiting Rebuild partners in Beatrice and York. The next target communities are Wayne and Norfolk.

By June 1998, the agency had secured 87 Rebuild Nebraska partners, performed energy assessments on 266 buildings, completed 46 reports to partners analyzing potential energy savings and identified one or more ways the improvements could be financed. The 266 buildings totaled more than 1.88 million square feet. Since Nebraska's Rebuild efforts began, the agency has consistently ranked in the top three states nationally in performance measurements.

To date, the agency has spent $111,409 from the two Rebuild Nebraska grants.

- **Rebuild Otoe County.** This two-year, $100,000 grant was received in April 1998 and will enable several local, regional and state organizations — River Country Economic Development Corporation, the Nebraska Municipal Power Pool, the Nebraska State Historical Society-Preservation office, Joslyn Castle Institute for Sustainable Development and the Energy Office — to demonstrate that historically significant commercial and multi-family buildings can be made energy efficient. The project will start in late 1998.

> "We're trying to help our local customers realize the benefits of Rebuild Nebraska."
>
> Bob Irby
> Energy Services Representative
> Nebraska Public Power District, York
> October 20, 1997

Oil Overcharge Funds

Since 1982, Nebraska has received oil overcharge funds (sometimes referred to as Petroleum Violation Escrow Funds) as a result of various court actions against oil companies that overcharged their customers during the period of federal price controls from 1973 to 1981. Since direct compensation to injured consumers seemed unrealistic, the courts ordered the money recovered from lawsuits be distributed to the states to fund programs that provide indirect restitution to injured energy consumers. States were directed to use the money, within parameters established by the courts, to fund energy assistance and efficiency programs.

The agency's three programmatic divisions — Energy Projects, Financing

Nebraska Energy Settlement Fund
A Summary of *Exxon*, *Stripper Well* and *Diamond Shamrock*
Oil Overcharge Funds as of June 30,1998

	Exxon	*Stripper Well*	*Diamond Shamrock*	Total
Total Received	$15,504,944	$14,886,493	$359,172	$30,750,609
Interest Earned	8,484,771	5,419,914	222,172	14,126,857
Total	**$23,989,715**	**$20,306,407**	**$581,344**	**$44,877,466**
Funds Budgeted				
Contracts	$4,018,016	$6,837,000	$0	$10,855,016
Program Development	103,692	0	6,434	110,126
Monitoring/Evaluation	361,527	0	0	361,527
Education	117,292	0	0	117,292
Load Management	50,039	0	0	50,039
Attorney General Legal Fees	0	299,327	0	299,327
Bank Wire Fees	0	98	0	98
Low Income Weatherization	4,022,371	3,770,099	0	7,792,470
Emergency Preparedness	45,907	0	0	45,907
Dollar & Energy Saving Loan Program	13,530,175	7,979,500	0	21,509,675
Loan Program Delivery	915,117	0	0	915,117
Special Projects	5,556	0	0	5,556
Designated Interest	653,198	939,392	0	1,592,590
Oil Overcharge Administration	0	384,199	565,724	949,923
Direct Restitution Project	0	0	9,186	9,186
Governor's Plan/1997	125,330	0	0	125,330
Uncommitted Balance	**$41,495**	**$96,792**	**$0**	**$138,287**
Allocated to Low Income Programs	$0	$32,881	$0	$32,881
Allocated to Native American Programs	$0	$13,683	$0	$13,683

Source: Nebraska Energy Office

Figure 4

and Weatherization — manage projects financed by oil overcharge funds.

The Nebraska Energy Settlement Fund

The Nebraska Energy Settlement Fund was established by the Legislature for money paid to Nebraska from overcharge cases since March of 1986. Total funds (including interest) received as of June 30, 1998, were $44.88 million: $23.99 million in *Exxon* funds, $20.31 million in *Stripper Well* funds and $.58 million in *Diamond Shamrock* funds (see figures 4 and 5 for specifics on how the funds have been used).

1997 Predisbursement Plan

In November 1997, the Governor submitted a plan for review by the legislature for use of $667,237 in oil overcharge funds ($125,330 in Exxon funds and $541,907 in Stripper Well funds).

The plan, which was implemented added $467,237 to the Dollar and Energy Saving Loan Program, $200,000 for energy efficient mortgages under the loan program, $117,214 for the Low-Income Weatherization Assistance Program and $5,223 to Native American Tribal governments.

Oil Overcharge Contracts

Exxon

Category	Allocated Funds	Contracts Issued	Expenditures Through June 30, 1998
Energy Education	$1,196,642	$1,196,642	$1,118,878
Financing Demonstrations	912,605	912,605	912,605
Agriculture	291,276	291,276	291,276
Feasibility Studies	187,993	187,993	187,993
Building Improvement Demonstration	729,499	729,499	729,499
Transportation	700,000	700,000	700,000
Load Management	50,039	50,039	50,039
Dollar and Energy Saving Loan Program	13,530,175	12,927,735	12,927,735
Low Income Weatherization	4,022,371	4,014,500	4,014,500
Total *Exxon* Contracts June 30, 1998	**$21,620,600**	**$21,010,289**	**$20,932,525**

Stripper Well

Category	Allocated Funds	Contracts Issued	Expenditures Through June 30, 1998
Low Income Weatherization	$3,770,099	$2,859,584	$2,452,745
State Buildings Energy Team	124,210	124,210	124,210
Local Government Energy Management Circuit Rider	400,000	400,000	352,564
Public Transportation	800,000	800,000	790,540
Energy Related Biotechnology, Solar and Conservation Outreach	2,000,000	2,000,000	1,836,846
Greenhouse Project	400,000	400,000	400,000
Innovative Energy Grants	100,000	75,000	50,768
Dollar and Energy Saving Loan Program	7,979,500	7,979,500	7,979,500
Indian Tribal Governments	77,000	77,000	68,472
University of Nebraska Building Weatherization	500,000	500,000	497,136
Nebraska State College System	1,500,000	1,500,000	1,494,959
Curtis Weatherization	250,000	250,000	231,861
Total *Stripper Well* Contracts June 30, 1998	**$17,900,809**	**$16,965,294**	**$16,279,601**

Source: Nebraska Energy Office

Figure 5

Oil Overcharge Projects From Previous Years

Activity this year for each oil overcharge project financed by the Nebraska Energy Settlement Fund, reviewed by the Legislature and approved by the U.S. Department of Energy is described on this page and those that follow in this section.

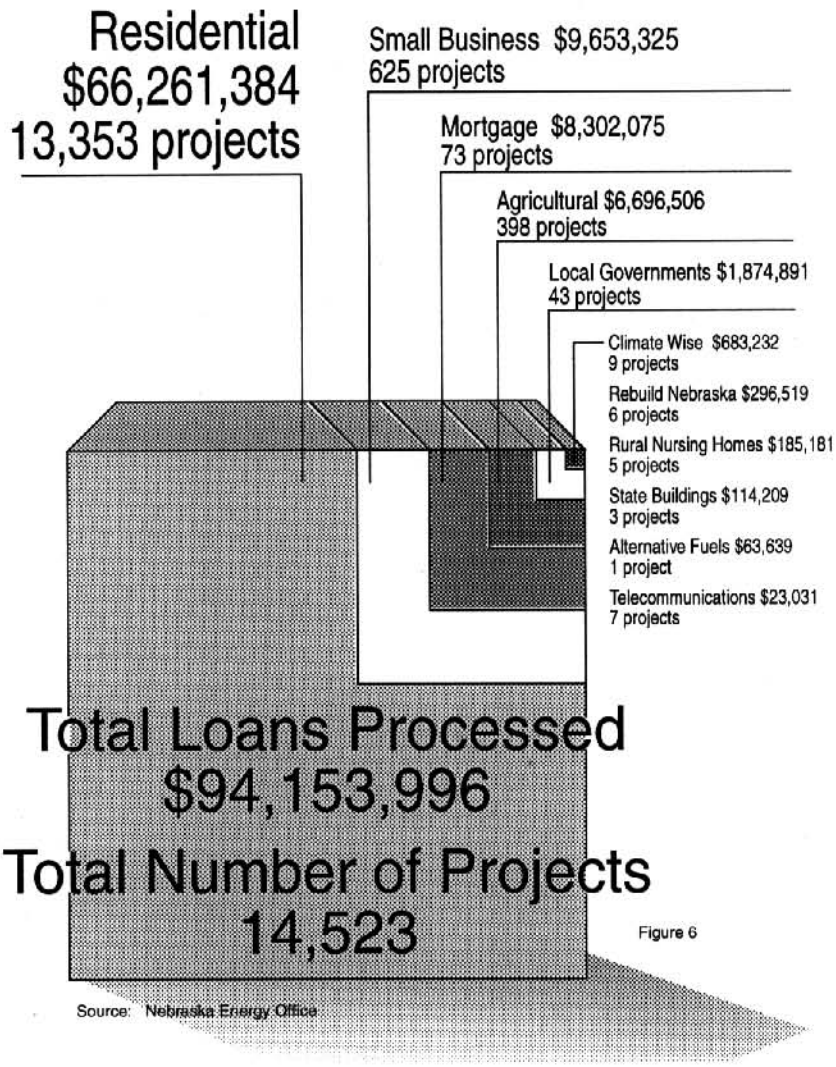
Dollar and Energy Saving Loans

Exxon funds totaling $13.53 million plus $7.98 million in *Stripper Well*, $.18 million in *Amoco*, $.01 million in *Coline*, $.08 million in *National Helium* and $.17 million in *Vickers* funds (amounts include interest earnings) have capitalized the Dollar and Energy Saving Loan Program, which provides low-interest loans to Nebraskans to finance home, building, transportation and system improvements. More than 320 participating lenders provide six percent interest rate financing for up to fifteen years on loans for energy saving improvements.

Some energy-saving improvements require an energy audit before a borrower may secure financing. These improvements may be financed for up to five, ten or fifteen years depending on the type of improvement, its cost and the amount of energy saved. Loans for energy audits are available directly from the Energy Office at no interest.

Applicants may obtain appropriate forms from the Energy Office, participating lenders, utilities or equipment dealers. After obtaining bids, applicants then submit loan forms to participating lenders at one of 666 sites

Oil Overcharge Funds Invested in Types of Dollar & Energy Saving Loans as of June 30, 1998



Source: Nebraska Energy Office

Figure 6

across the state. Once a lender approves the loan application, a commitment agreement is submitted to the Energy Office for review. On final approval from the agency, the lender notifies the applicant to proceed with the energy improvement.

1997-1998 Highlights

By mid-1998, the Energy Office had issued more than 14,500 Dollar and Energy Saving Loans. The loans first became available in mid-1990. Before the end of 1998, the agency expects to surpass two milestones of note:

- $100 million in loans issued and
- 15,000 projects financed.

Since the loan program began more than eight years ago, 14,523 projects totaling $94,153,996 have been financed. More than $47.05 million in oil overcharge funds (including interest and loan payments) have leveraged in excess of $50.58 million from the state's private lenders. These projects also leveraged an additional $12.2 million spent on non-energy related improvements to the properties.

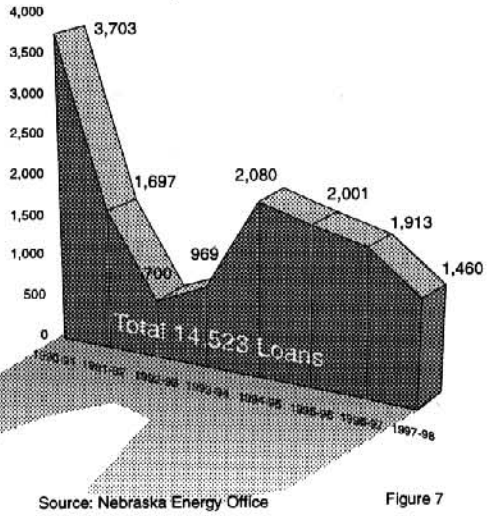
Loans have financed projects in 92 of the state's 93 counties. Each year about 1,700 loans are available for financing new projects worth in excess of $10 million. The average amount of a loan is $6,483.

For reporting and other purposes, the agency "categorizes" loans into one of 11 types. The summary of the major categories follows:

◆ **Residential Improvements.** Nearly 92 percent of all the energy efficiency projects financed are made in the homes of Nebraskans. Slightly more than 70 percent of all loan funds have financed typical home improvements such as replacing or installing furnaces, air conditioners and heat pumps, replacing windows and doors and insulating walls and ceilings. Typically these improvements have a lifetime of 20 years and longer and will continue to pay benefits in the form of lower energy bills for the homeowners for decades to come. By mid 1998, the Energy Office and lenders had teamed to finance more than 13,359 projects totaling $66.2 million. An additional $4.7 million worth of improvements were made on these projects.

◆ **Small Business Improvements.** More than 10 percent of the low interest financing — $9.6 million — has been used to make improvements in 625 buildings and systems in small businesses in the state. About one-third of the financing has been used to replace furnaces and air conditioners. Much like home energy-saving projects, insulation and replacement doors and windows are

Number of Dollar and Energy Saving Loans Made By Fiscal Year



Source: Nebraska Energy Office

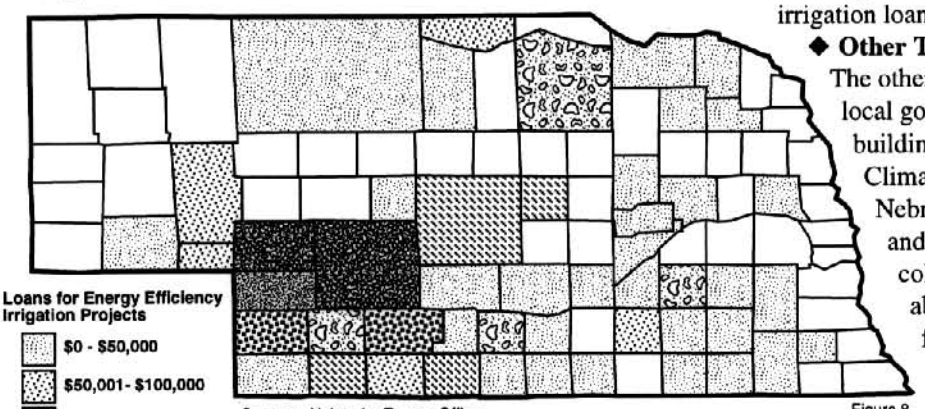
Figure 7

high on the list of typical improvements made by business owners.

◆ **Mortgage Loans.** The Energy Office only began financing new home construction in 1996-1997. Since that time, this project category has become the fastest-growing one. To date, the agency and lenders have financed 73 new homes that surpass the 1995 Model Energy Code by up to 30 percent. In financing these projects, the agency offers inducements in the form of interest rate reductions - from 1/4 to 1 percent interest — to encourage future homeowners and their builders to construct very, very energy efficient homes. The maximum mortgage amount is $250,000. To date, the Energy Office and lenders have financed $8.3 million in new home construction, and the lenders and homeowners have financed an additional $3.9 million on the same 73 projects. Currently, 8.8 percent of all loan funds have been used for new home mortgages. The weatherization mortgages, described in greater detail on page 2, are also included in this loan category.

◆ **Agricultural Improvements.** Coming in a close fourth in use of these funds, are loans for agricultural equipment and systems. More than 7.1 percent of all loan funds have financed typical agricultural projects such as low-pressure irrigation systems, replacing irrigation pumps and motors, making well modifications and replacing grain dryers. Since 1990, the Energy Office and lenders have issued 398 loans totaling $6.69 million for agricultural projects. On average, agricultural loans exceed $16,000. As illustrated in figure 8, farmers in the southwest part of the state have used irrigation loans the most.

Irrigation Loans 1990-1998



Source: Nebraska Energy Office

Figure 8

◆ **Other Types of Improvements.** The other categories of loans - local governments, state buildings, rural nursing homes, Climate Wise, Rebuild Nebraska, telecommunications and alternate fuels - collectively account for about 1.5 percent of all loan funds.

◆ **Impacts.** A 1997 evaluation of the impact of Dollar and Energy Saving Loans found the projects have created the equivalent of 1,416 jobs between 1990 and 1996, primarily among heating and cooling contractors and remodeling industries all across the state. Savings earned by Nebraskans who used the loans to finance improvements in their homes came in two ways: savings from reductions in energy use and savings from lowered financing costs.

Between 1990 and 1997, the dollars saved by Nebraskans from reduced energy use total $16.9 million and the savings from the reduced financing costs total $15.86 million.

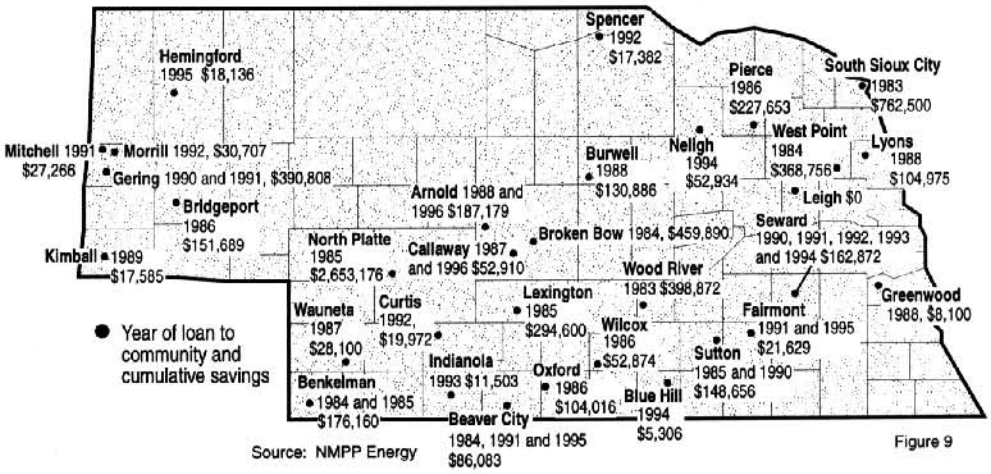
Electrical Load Management Resource Fund

Created in 1983, the Electrical Load Management Resource Fund was capitalized with $50,000 in *Exxon* oil overcharge funds. Under contract, NMPP Energy managed the loan applications and repayments until the fund closed in 1997.

The fund offered interest-free financing to the 90-plus Nebraska utility members of NMPP Energy to help purchase, install or upgrade load management systems. These systems allow utilities to monitor and reduce peak demand, save energy and avoid being charged for expensive electricity used during peak times.

Over the 13 years of operation, the initial capital investment of $50,000 has financed more than $450,000 in improvements, saving ratepayers in the participating towns

Cumulative Savings of Communities Borrowing Electrical Load Management Resource Funds, 1983-1997



Source: NMPP Energy

Figure 9

Total Estimated Savings to Date $6,555,111

almost $7.2 million (see figure 9). Communities that install load management systems continue to earn additional savings during the lifetime of the equipment.

Innovative Energy Grants

Stripper Well funds totaling $100,000 were available for grants to individuals for research and/or development of energy-related inventions.

In this program's seven years, 33 preapplications have been received. Of those, 11 completed the full application. Six of the 11 were reviewed by the University of Nebraska for technical feasibility. The Energy Office, along with the University's Technical Assistance Center, developed evaluation criteria for project review. Research continued on these previously selected projects:

◆ A $50,000 grant was awarded to Grain Systems of Elm Creek in 1993 to complete the design and fabrication of a prototype grain dryer which utilizes a heat pump to dehumidify drying air which circulates in a closed loop. Only $43,140 of the grant was spent to design and build a working prototype that was evaluated for further development. The U.S. Department of Agriculture and the Electric Power Research Institute provided assistance in development of the prototype.

◆ A $25,000 grant was awarded in 1994 to S-Arrow of Hastings to demonstrate a catalyst-enhanced pyrolysis process using waste tires. The process is expected to produce a fuel gas with higher energy content than that produced by typical pyrolysis.

Work on both these projects was completed in 1997.

Lincoln Energy Conservation Interest Subsidy and Rebate Program

This local subsidy and rebate program ended in 1991 after financing 416 projects totaling nearly $360,000. Some loans were retired earlier than planned and not all subsidies were fully utilized by the borrowers. Unused subsidies are returned to the Energy Office.

Low-Income Weatherization Assistance Program

A total of $7.79 million in oil overcharge funds ($4.02 million from *Exxon* and $3.6 million from *Stripper Well*) have been allocated to the Low-Income Weatherization Assistance Program to assist low-income Nebraskans with residential weatherization to reduce energy use and costs. In 1997-1998, $164,270 in *Stripper Well* funds were spent through the program.

The terms of the *Stripper Well* court order mandate that an equitable share of the funds be set aside for the state's low-income population. To date, $2,452,745 in *Stripper Well* funds have been spent.

For more detailed information about the Low-Income Weatherization Assistance Program, see pages 1 and 2.

Native American Tribal Governments

The *Stripper Well* court order requires the state to provide an equitable share of oil overcharge funds to Native American tribal governments. Based on the number of Native Americans in the state, $77,000 have been set aside for eligible projects suggested by the tribal governments.

No projects were undertaken in 1997-1998. A total of $8,528 remains for Native American projects.

Planning, Monitoring and Evaluating Oil Overcharge Programs

To comply with federal and court reporting regulations, $384,199 in *Stripper Well* and $450,000 in *Exxon* funds have been committed for planning, monitoring and evaluating programs funded with oil overcharge dollars. In 1997-1998, a total of $13,111 in *Stripper Well* funds were spent.

Schuyler Energy Conservation Loan Program

Schuyler city government and its Energy Commission ended their low interest energy loan program for homes, businesses, nonprofits and governmental buildings.

To date, ten commercial loans totaling $148,272 ($88,963 in *Exxon* funds) and 143 residential loans totaling $404,700 ($242,420 in *Exxon* funds) have been made. Loan repayments will continue for many years to come. The portion of the loan funds being repaid to the Energy Office will continue to accrue in the project account until all loans have been paid.

Statewide Energy Education

Starting in 1993, the Energy Office joined with the Nebraska Math and Science Initiative to further energy education in the state. The Initiative is a group of educators across the state and staff from the University of Nebraska-Lincoln working to improve science and math education.

In 1994, the Energy Office committed $500,000 more in *Exxon* funds to match a $4.9 million grant to achieve excellence in elementary and secondary math and science education. Since this project began, more than 2,500 teachers have attended energy education workshops and 208 grants totaling $229,000 have been awarded for specific energy projects in schools across the state.

During the reporting period, $60,997 was spent for teacher training and grants.

The Initiative continued to operate the agency's energy education resource library and maximize use of the Internet for locating energy education resources.

Stuart Energy Conservation Loan Program

While this local commercial loan program ceased making new loans in 1991, repayments from the borrowers will continue beyond the beginning of the next century. The portion of the loan funds being repaid to the Energy Office will continue to accrue in the project's account until all loans have been repaid.

University of Nebraska Energy-Related Research

The University of Nebraska received $2 million in *Stripper Well* funds to further energy-related research. Projects selected had to secure matching funds before qualifying for oil overcharge dollars.

Twelve research projects were completed. The last project was headed by Dr. David Jones, of the University of Nebraska-Lincoln Department of Biological Systems Engineering. The

$170,000 project sought to develop a binder using waste fluids from ethanol production. The binder is mixed with waste paper to produce fuel pellets. The match requirement of $170,000 was met by a Nebraska research pioneer who donated both money and equipment. A patent was awarded for this process in June 1998.

A total of $1,871,183 in oil overcharge funds were spent by the University for research conducted under this grant. The grant was completed during this reporting period.

Other Energy Settlement Funds

Not all oil overcharge funds are part of the Nebraska Energy Settlement Fund. Some of these funds have been held in escrow by the U.S. Department of Energy's Office of Hearings and Appeals. These funds are distributed to the states as payments made by oil companies according to settlement agreements. According to the Department of Energy, all future oil overcharge funds received by the state will be classified as *Stripper Well* funds and not subject to review by the Office of Hearings and Appeals.

Specific Oil Overcharge Projects

The status of the only oil overcharge project financed with these miscellaneous funds is described on this page.

Statewide Energy Information Service

In 1992-1993, the Energy Office began to develop energy information services to assist consumers to make decisions resulting in the efficient and economic use of energy.

Funded with $150,000 in *Amoco* funds, the agency developed a library collection, utilized, displays from other organizations and developed and distributed energy informational materials at a variety of events. Since 1992, $128,222 have been spent on this activity.

International, National and Regional Organizations

Since the Energy Office was created in 1973, the agency has been active in numerous regional and national organizations.

However, beginning in 1991, the historic role the agency played in organizations began to change to one requiring leadership and administrative skills:

- In 1991, the nine-state Governors' Ethanol Coalition was founded and the Energy Office was designated the group's headquarters. The 22-member group fosters ethanol growth regionally, nationally, and internationally.
- In 1997, the seven-state Governors' Public Power Alliance was formed and the Energy Office was designated to handle administrative details for the group.
- In 1997, the Energy Office was selected by the U.S. Department of Energy to run the day-to-day operations of the 13-state Western Regional Biomass Energy Program. The Energy Office's contract to operate Western runs through 2001.

The activities of each organization during the reporting period are profiled in this section.

Governors' Ethanol Coalition

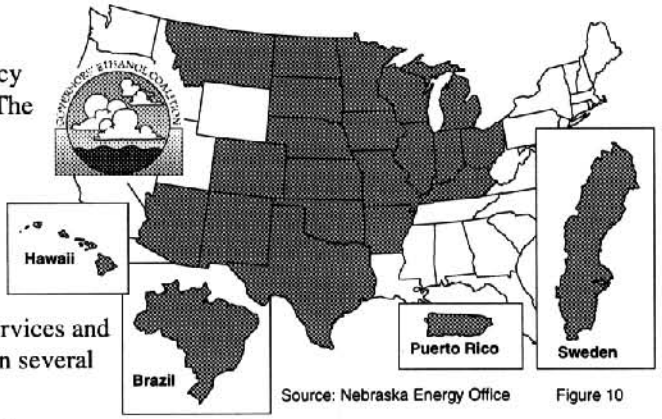
By 1998, 21 states and one territory were members of the ethanol policy and promotion group as well as representatives from Brazil and Sweden. The goals of the organization are to increase the use of ethanol, to decrease the nation's dependence on imported energy resources, improve the environment and stimulate the national economy.

The Energy Office director is one of the Governor's representatives on the Coalition and the agency is the administrative headquarters of the group.

For the 1997-1998 fiscal year, the Coalition expended $374,453 for services and activities. During the reporting period, the Coalition undertook activities in several areas:

- The National Ethanol Research Institute, operated under contract by the Consortium for Plant Biotechnology Research, continued to oversee two previously selected research projects. The projects listed below are funded by a $250,000 U.S. Department of Energy grant received in 1994-1995:
  - A University of Iowa professor is exploring the conversion of ethanol to hydrogen;
  - A University of Missouri-Columbia professor is testing the economic feasibility of converting trees into ethanol.
- The quarterly *Ethanol Alert,* financed with a U.S. Department of Energy grant, was delivered to 4,000 subscribers across the nation.
- Arizona joined as the group's 22nd member.
- Fourteen university and college teams, including students from the University of Nebraska-Lincoln, competed in the first National Ethanol Vehicle Challenge. The competition challenged teams of engineering students to improve mileage, reduce automobile emissions and improve cold start performance on passenger cars that had been modified to operated on 85 percent ethanol and 15 percent gasoline. Fifty thousand dollars was raised to cover the expenses of the University of Nebraska's team.
- The Coalition and other interested parties agreed to target three urban areas — Minneapolis, Chicago and Denver — to develop approaches for increasing the number of 85 percent ethanol pumps available to the public.
- The Coalition and numerous interests successfully achieved the extension of the federal tax credit on ethanol blended fuels to 2007. In previous sessions of Congress, the federal tax credit had been targeted for elimination.
- The Coalition and its affiliate organization, the National Ethanol Vehicle Coalition, continued to expand the use of E85, a blend of 85 percent ethanol and 15 percent gasoline. This activity, funded by the federal energy department, the National Corn Growers and other organizations, received $258,737 from the Coalition.
- With encouragement from the Coalition's international committee, the Mexican federal government began using 10 percent ethanol blended gasoline in a portion of its vehicle fleet in Mexico City. The 20,000 cars are the beginning of a phased increase in use of ethanol blended fuels. For now, U.S. ethanol producers are supplying the Mexican market.
- California, which uses the cleanest transportation fuels produced in the world to address air pollution problems, continued to search for a solution to MTBE water pollution problems. MTBE, or methyl tertiary butyl ether, is one of several oxygenates that are added to fuels to reduce car emissions. In the past several years, increasing amounts of MTBE have been found in water resources in California. Because of its chemical properties, MTBE is very difficult to remove from water. The state's scientific, environmental and political community have been unable to reach a consensus on replacing the oxygenate in gasoline. Ethanol or one of its chemically-related

Governors' Ethanol Coalition Members



Source: Nebraska Energy Office Figure 10

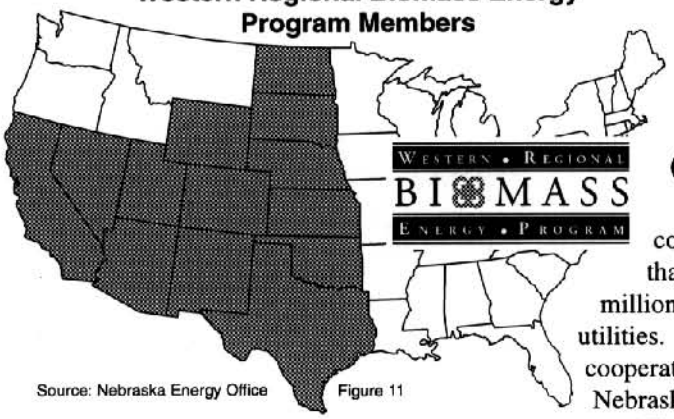
alternatives is one possible replacement for MTBE.

- The agency also maintains the Coalition's web site: www.ethanol-gec.org
- The 3rd edition of *Clean Fuels: Paving the Way for America's Future* was published and distributed. A U.S. Department of Energy grant of $30,000 was used for this purpose.
- A portion of the grant from the federal energy agency, $75,970, was spent by the Iowa Governor and Chair for marketing research.

Western Regional Biomass Energy Program

In late 1997, the agency was selected by the U.S. Department of Energy to operate the 13-state Western Regional Biomass Energy program, one of five regional projects across the nation. The Energy Office manages the program with the Denver Regional Support Office under a cooperative agreement.

Western Regional Biomass Energy Program Members



Source: Nebraska Energy Office Figure 11

Biomass is renewable organic matter, such as forest residues, agricultural crops and wastes, wood and wood wastes, animal wastes, livestock operations residues, aquatic plants and municipal wastes.

The five year operational contract is for $3.4 million which covers the salary and expenses of the agency employees who provide support for the endeavor and grants for projects. Examples of the work performed include publication and distribution of a quarterly newsletter, publication and distribution of an annual solicitation for projects, monitoring of projects funded by Western, distribution of Western-produced materials and creation and maintenance of a web site: www.westbioenergy.org

Governors' Public Power Alliance Members

Source: Nebraska Energy Office Figure 12

Over the years, Western has been responsible for providing funding for numerous projects in Nebraska including Lincoln's 95 percent ethanol buses, soydiesel fuel tests in Department of Roads' trucks and Clean Cities activities.

In April, representatives from the 13-state region that provide oversight selected 19 projects totaling $947,530 in ten states for funding. An estimated $2.14 million will be provided in matching funds. A record-breaking 82 proposals totaling $4.8 million had been submitted for funding. In Nebraska, four projects were funded:

- $8,806 to the Nebraska Soybean Board for use of soydiesel in Nebraska Department of Roads' trucks;
- $20,000 to the University of Nebraska-Lincoln for costs associated with competing in the National Ethanol Vehicle Challenge;
- $58,734 to the National Arbor Day Foundation to modify the Foundation's Conference Center wood-fueled heating/cooling system so that visitors can view its operation;
- $75,000 to High Plains Corporation to explore the possibility of using methane gas produced from ethanol waste products to power a fuel cell that would generate heat and electricity for the plants' use.

Governors' Public Power Alliance

The Governors' Public Power Alliance — a bipartisan, short-term coalition of seven of the nation's governors — was formed to make certain that electric industry restructuring by Congress does not disadvantage the 68 million Americans who are served by locally-and consumer-owned electric utilities. More than 2,000 publicly-owned electrics and 900-plus rural electric cooperative utilities provide services to almost one-quarter of Americans. In Nebraska, the entire state is served only by publicly-owned power systems.

The Alliance advocates positions on issues that are beneficial to all consumers, whether served by customer-owned or investor-owned electric utilities. The governors are concerned that consumers served by local and regional electrics may be overlooked in federal legislative and regulatory proposals, and seek to counter-balance the political influence of the investor-owned utilities which are driving restructuring activities.

During the group's first year, Nebraska Governor Nelson served as chairman and Tennessee Governor Sundquist served as vice chairman.

The Energy Office provides administrative support to the Alliance and maintains the group's web site: www.publicpoweralliance.org

Energy Efficiency, Renewable Energy, Nuclear Waste Transportation Issues and Other Energy Concerns

As the agency adapts to an ever-changing world of energy use and production, so the services and work performed by the Energy Office also change. During 1997-1998, the agency worked and funded, directly or indirectly, new activities that involved energy efficiency, renewable energy and nuclear waste transportation issues as well as the historical activities for which it is known.

Clean Cities

In 1996-1997, the Energy Office received several grants totaling $30,000 to conduct a Midwestern regional Clean Cities town hall meeting. Clean Cities is a locally-based, voluntary government and industry partnership to expand the use of alternatives to gasoline and diesel fuel.

The town hall meeting was held in Omaha in September 1996. The primary focus of the gathering was to acquaint vehicle fleet managers in the region with higher percentage blended ethanol fuels and other alternative fuels such as soydiesel. Representatives for other fuel types — natural gas, propane and electricity — also presented information as well as displayed alternate fuel vehicles.

The $30,000 in grants came from three sources: $20,000 from the federal Department of Energy and $5,000 each from the Great Lakes Biomass Energy Program and the Western Regional Biomass Energy Program.

During the reporting period, the agency finished the production of a videotape of the town hall meeting.

High-Level Nuclear Waste Transportation and Storage

The majority of nuclear waste in Nebraska is produced by the two nuclear power stations in Brownville and Fort Calhoun. For storage purposes, radioactive waste material is classified as high-level or low-level waste depending on the length of time the waste remains radioactive.

High-level waste is spent nuclear fuel and has primarily been stored on site at nuclear power plants awaiting construction of a temporary or permanent repository.

Once a temporary or permanent storage site becomes available, transporting the high-level waste will begin. Because many nuclear facilities are east of Nebraska and likely storage areas are west of the state, rail lines and highways in Nebraska are probable corridors for shipments of high-level radioactive waste.

Two national studies have indicated that 92,000 shipments of spent nuclear fuel and high-level radioactive waste currently stored at sites across the nation will be shipped over a period of 30 years to temporary or permanent storage sites. Based on the latest information, it is estimated that 62 percent of the nation's truck shipments of spent nuclear fuel and 82 percent of the nation's rail shipments will cross Nebraska. Current projections indicate an estimated 49,166 truck shipments and 10,332 rail shipments will cross the state.

The Energy Office became involved in two issues related to the transportation and storage of spent nuclear fuel during the previous and current reporting periods:

- In 1996, Nebraska joined nearly 20 other states and several utilities in filing a lawsuit against the U.S. Department of Energy when the federal agency announced that it had no obligation to begin accepting nuclear waste until a storage facility was constructed. The Court of Appeals for the District of Columbia agreed with the states, ruling that the federal energy department must begin accepting nuclear shipments in 1998. The Energy Department has not determined how, when or where the agency will begin accepting spent nuclear fuel.

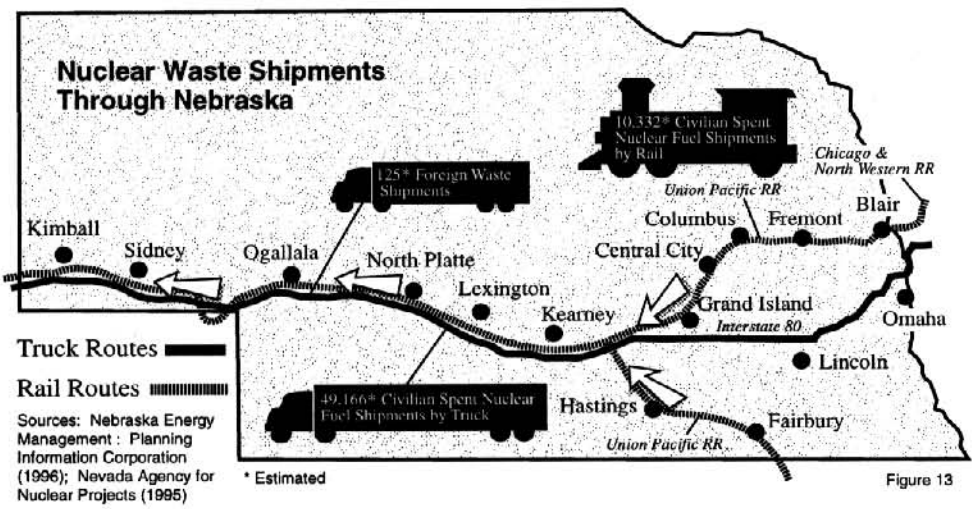


Figure 13

- During the reporting period, the Energy Office, Emergency Management, the State Patrol, the Department of Health and others continued to examine the state's readiness for a dramatic increase in the number of shipments of spent nuclear fuel across the state.

Hydropower Resources Assessment

In 1996, the Idaho National Engineering Laboratory completed a draft of a statistical assessment of potential hydropower resources in all states. The assessment projected the maximum amount of energy that could be produced if the sites were developed.

The Energy Office was then asked to evaluate their assessment of the Nebraska sites based on 20 factors such as recreational use, historic value and presence of endangered species. The state's Game and Parks Commission assisted the agency in completing the evaluation. During the reporting period, the Energy Office received $2,500 for completing the assessment.

National Energy Code Compliance on New Home Construction

The agency was requested by the Nebraska office of the U.S. Department of Housing and Urban Development to review house plans of Nebraskans financing the purchase of their home with a Veterans' Administration, Farmers' Home Administration or Federal Home Administration mortgage. To be eligible for the government-backed mortgages, the homes must meet or exceed the 1992 Model Energy Code. The agency charges $50 for each review.

In 1997-1998, the agency evaluated three homes for compliance with the energy code. The 83 percent decline in the number of homes evaluated from the previous year is not a true reflection of these activities since many of these reviews are now covered by a federally-funded State Energy Program grant that encourages Nebraskans to construct more energy-efficient homes (see page 4 for more details about this grant).

Wind Resource Assessment

In mid-1994, the Nebraska Power Association and other renewable energy interests including the Energy Office agreed to participate in a multi-year study of eight wind sites in the state for their energy producing potential.

On behalf of the Power Association, the agency applied to the Utility Wind Interest Group for a grant to partially fund the Nebraska wind study. In late 1995, the Power Association received a $59,600 grant from the Interest Group.

In early 1996, the Energy Office received another grant in support of the Nebraska wind project. The National Renewable Energy Laboratory awarded a $74,428 grant to also partially fund the project. A $10,000 grant from the American Public Power Association was also received by the Power Association in support of the project. The state's major utilities are supplying the remainder of the cost of the study. The assessment, which has been extended until March 1999, is expected to cost more than $300,000. When concluded, the study will have four years of data from all the sites.

During the first two years of the study, the average annual wind speeds ranged from 14.6 to 16.6 miles per hour and generally were in the early afternoon. Valentine and Springview had the highest speeds at 16.6 and 16.3 miles per hour, respectively. The lowest wind speeds were recorded at Rushville and Wahoo, 14.8 and 14.6 miles per hour, respectively.

Ethanol and Other Alternate Fuels

Historically, the role of the Energy Office in the development of alternate transportation fuels has been that of advocate and demonstrator. The Governor requested the agency, in its role of energy policy advisor, to take a more active role in coordinating the development and use of ethanol-based fuels, not only in the state, but around the country as well.

With the passage of the amendments to the *Clean Air Act* in 1990 and the subsequent passage of the *Energy Policy Act* in 1992, cleaner burning fuels of all types became a national priority. Generally, the transportation fuel types considered "alternate" are biodiesel, electricity, ethanol, methanol, natural gas and propane.

The thrust of alternative fuel efforts has been on the fuels and additives to be used in the carbon monoxide and ozone nonattainment areas of the country which are required to use cleaner-burning transportation fuels.

1997-1998 Highlights

A number of issues and activities involved the agency as it fulfilled its role in fostering the growth of alternate transportation fuels, including ethanol.

At the state level, the Governor's 1992 *Energy Action Plan* and the 26-member Alternate Fuels Committee serve as the guiding forces in increasing the use of cleaner-burning transportation fuels and reducing the state's overall dependence on petroleum-based fuels.

During the reporting period, the agency completed a videotape of a September 1996 Clean Cities meeting in Omaha. Clean Cities is a voluntary, locally-based government and industry partnership, coordinated by the U.S. Department of Energy, to expand the use of alternatives to gasoline and diesel fuel.

Nebraska Ethanol Production Developments

In 1997, the state retained its position as the number three ethanol producer in the nation. An estimated 200 million bushels of the state's grain crops — corn and grain sorghum — are used to produce ethanol and other by-products. A total of seven operating plants are capable of producing up to 300 million gallons of ethanol annually, about 15 percent of all ethanol produced in America. The plants employ 735 Nebraskans directly and an estimated 3,600 others indirectly — a total of 4,325 jobs.

85 Percent Ethanol Efforts in Nebraska

As part of a Governors' Ethanol Coalition effort (more about the Coalition is on page 11), the Energy Office directly and indirectly coordinated efforts to increase the use of 85 percent ethanol as an alternate fuel both inside the state and across the nation:

- The E85 percent ethanol coordinator hired in the previous reporting period continued to perform activities in the state in 1997-1998. The coordinator is responsible for some Clean Cities organizational activities as well as securing locations for public 85 percent ethanol stations in Nebraska. The Energy Office paid $11,401 in 1997-1998 for the work performed. Unspent Clean Cities funds and grants of $3,859 from the Nebraska Soybean Board and $2,342 from the state's Grain Sorghum Board covered these expenses.

Biodiesel Efforts in the State

An 11-month test of biodiesel — a blend of soybean oil and diesel fuel — in some of the Nebraska Department of Roads' trucks ended in August, 1997. The fuel test used 90 percent diesel and 10 percent soybean oil in 100 trucks headquartered at six facilities in eastern Nebraska.

By the end of the test, the heavy duty trucks had traveled more than half a million miles and used more than 126,000 gallons of blended fuel. The Roads Department concluded, "biodiesel works. It is safe and it is a renewable energy that supports our local economy. It does not harm the engine or affect performance or mileage to a noticeable degree."

The cost of the test, $49,605, was shared equally by the Roads Department, Energy Office and Nebraska Soybean Association. The Energy Office's share came from funds provided by the U.S. Department of Energy's Western Regional Biomass Energy Program.

In April, 1998, the Roads Department began using SoyGold™ in all its vehicles. SoyGold contains one percent soybean oil and 99 percent diesel fuel. As a result, the cost of the fuel is competitive with regular diesel fuel. This $36,700 project is being co-sponsored by the Roads Department, Energy Office, Nebraska Soybean Association, AGP, Inc., Farmland and the Western Regional Biomass Energy Program.

Natural Gas Technical Assistance

About 30 percent of the state's natural gas consumers receive their service from one of 15 municipally-owned natural gas utilities. The remaining 70 percent receive natural gas from one of four investor-owned natural gas utilities — KN Energy, Midwest Gas, Northwestern Public Service and Peoples Natural Gas Company.

One town in Nebraska may be unique in the entire country and provide a glimpse into the world of tomorrow's natural gas service. Kearney has granted franchises to two different investor-owned natural gas utilities to provide service to the town's residents.

Natural gas is imported into the state to the investor-owned and municipally-owned utilities primarily through major pipelines operated by Northern Natural Gas Company and KN Energy.

Beginning in 1998, an increasing number of smaller natural gas customers have been able to select other companies to meet their natural gas needs. However, the traditional retail gas company still delivers the natural gas to the customer. At this time, not all consumers in the state can choose their gas supplier.

Municipal Natural Gas Regulation Act

Nebraska is one of only two states in the nation to regulate investor-owned natural gas suppliers at the local level. Village boards and city councils review rate requests under the state's *Municipal Natural Gas Regulation Act*. The Energy Office administers the Municipal Natural Gas Regulation Revolving Loan Fund, created by the *Act* to provide interim financing of rate regulation.

Revolving Loan Fund

The Municipal Natural Gas Regulation Revolving Loan Fund was initially capitalized with $350,000 in oil and natural gas severance tax revenues. The fund finances local review of utility-initiated general rate requests and judicial review, if necessary. Groups of communities borrow from the fund to finance the rate studies and the fund is replenished in the same amount by the utilities, which in turn recover the cost of regulation from the ratepayers.

Regulations governing the loan fund were adopted and took effect in 1987.

1997-1998 Loan Fund Activities

In 1997-1998, two rate areas — groups of communities —served by one investor-owned utility were involved in ratesetting activities financed with $153,441 from the Municipal Natural Gas Regulation Revolving Loan Fund:

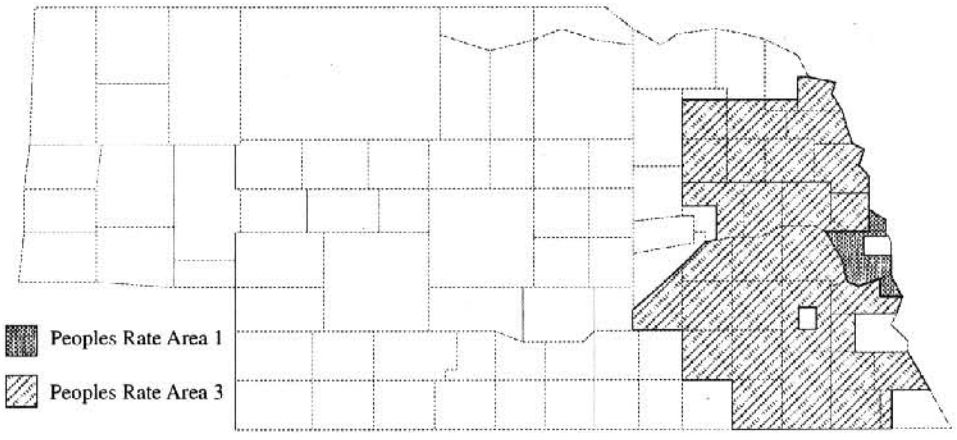
- Eleven suburban Omaha towns in Rate Area 1 continued the legal review of the rate-setting process during the reporting period. The Lancaster County District Court ruled in favor of the communities, however, the utility appealed the decision to the Appelate Court. Ultimately, the Supreme Court took over jurisdiction of the case. The legal action remained unresolved at the end of the reporting period. In 1997-1998, another $5,500, was approved to finance the Supreme Court phase. The loan amount for this phase now totals $15,500.
- The loan fund was replenished with a $147,943 payment by Peoples Natural Gas for the cost of rate setting activities by 94 eastern Nebraska towns in 1995-1996.

Technical Assistance

Throughout the reporting period, the Energy Office provided assistance to municipal officials during all phases of the regulatory process as mandated by statute.

Typical kinds of assistance include organizing and providing support services for rate area committees, publishing periodic issues of the *Natural Gas Rate Regulation Update* in each utility's service area, issuing requests for proposals for professional services, providing informational broadcasts and responding to specific inquiries regarding the regulatory process.

Areas Utilizing Natural Gas Revolving Loan Funds in 1997-98



Source: Nebraska Energy Office

Figure 14

Grants

During the current reporting period, the Energy Office received several new one-time or project-specific grants for use by the agency or for regional groups. These new grants, totaling $739,146 are detailed here and in other sections as indicated.

Nebraska Grain Sorghum Board
Nebraska Soybean Board

During the reporting period, the state's Grain Sorghum Board provided $2,342 and the Nebraska Soybean Board provided $3,859 to the agency to partially pay the expenses of the Clean Cities Coordinator. More information about this project can be found on page 15.

U.S. Department of Energy

Clean Cities

The agency received a $20,000 grant from the U.S. Department of Energy to host and record a regional Clean Cities town hall meeting in Omaha in September 1996. Clean Cities is a locally-based, voluntary government and industry partnership to expand the use of alternatives to gasoline and diesel fuel. The balance of these funds was expended during the reporting period.

Governors' Ethanol Coalition

During the reporting period, a grant of $250,000 was received from the federal Department of Energy in support of the Governors' Ethanol Coalition. See pages 11 and 12 for more information on the Coalition's activities.

Great Lakes Regional Biomass Energy Program

In 1996-1997, the Energy Office received a $5,000 grant to pay for a portion of the cost of hosting a regional Clean Cities conference in Omaha. The balance of these funds was expended during this reporting period.

National Industrial Competitiveness through Energy, Environment and Economics

In 1994-1995, the agency received a $1,250 grant to promote partnerships that develop and demonstrate advances in energy efficiency and clean production technologies to industries and utilities in the state. During the reporting period, the agency spent the remaining balance of $353.

National Renewable Energy Laboratory

Two grants totaling $18,150 were received from the U.S. Department of Energy's National Renewable Energy Laboratory. The Energy Office contracted with the University of Nebraska-Lincoln to perform a literature search of research involving methyl tertiary butyl ether (MTBE) and ethyl tertiary butyl ether (ETBE). The resulting work was provided to the California Energy Commission for inclusion in its report on the health effects of MTBE. All funds from these grants were spent during the reporting period.

State Energy Program Special Projects Grants

In 1997-1998, the Energy Office received a total of $355,510 in competitive grants from the U.S. Department of Energy for multi-year efforts to expand the agency's work with commercial businesses and multi-family housing groups and to encourage Nebraskans to construct more energy-efficient buildings.

For more information about these grants, see pages 3-5.

Sustainable Technology Energy Partnership Pilot Program

In 1996, the Energy Office received a $74,428 Sustainable Technology Energy Partnership Pilot Program grant from the National Renewable Energy Laboratory to provide partial funding for monitoring wind speed and direction as well as solar energy at eight locations in Nebraska.

The Nebraska Power Association, under contract to the agency, is the project coordinator for the wind study. As of June 30, 1998, $68,951 of these funds had been spent by the Power Association. For more about this project, see page 14.

Western Regional Biomass Energy Program

The Western Regional Biomass Energy Program is one of five regional projects across the country designed to develop short-term, cost-effective uses for biomass resources. An agency representative serves on a program advisory board, which directs the regional program as well as specific projects.

During the reporting period, the Energy Office began day-to-day operational oversight for the 13-state region. A $109,285 grant was received by the Energy Office for the day-to-day operation of the Western regional program. The agency spent only $69,192 from the grant. More information about the program is found on page12.

Work on two previous grants from Western was concluded during the period:

- A $16,700 grant was reduced to $16,535 for the partial cost of a Department of Roads test of soydiesel in heavy duty trucks. More about this test is found on page 15.
- The remaining balance of a $5,000 grant was spent on the Clean Cities conference held in Omaha. More about this project can be found on page 13.

U.S. Environmental Protection Agency

In 1994-1995, the agency received a non-competitive grant of $103,837 to develop a national training program for use of student interns to perform lighting audits in institutional buildings under the EPA's Green Lights Program. During the current reporting period, the remaining grant funds were spent and the project concluded.

Fiscal and Organizational Notes

Financial Review

The accompanying figures illustrate the Energy Office's income and expenses from July 1, 1997, through June 30, 1998, which amounted to $10,054,822 and includes federal, state and oil overcharge funds.

Approximately 58 percent of the agency's funding came from oil overcharge funds, about the same percentage as the previous year.

State funds came exclusively from severance taxes. No state general funds have been appropriated to the Energy Office since 1983.

Fifty-seven percent of all expenditures were used for oil overcharge aid and contracted projects listed in the Oil Overcharge Funds section starting on page 6. Sixty-eight percent of all federal funds were expended as aid in the Low-Income Weatherization Assistance Program.

Where The Money Came From, 1988-1998

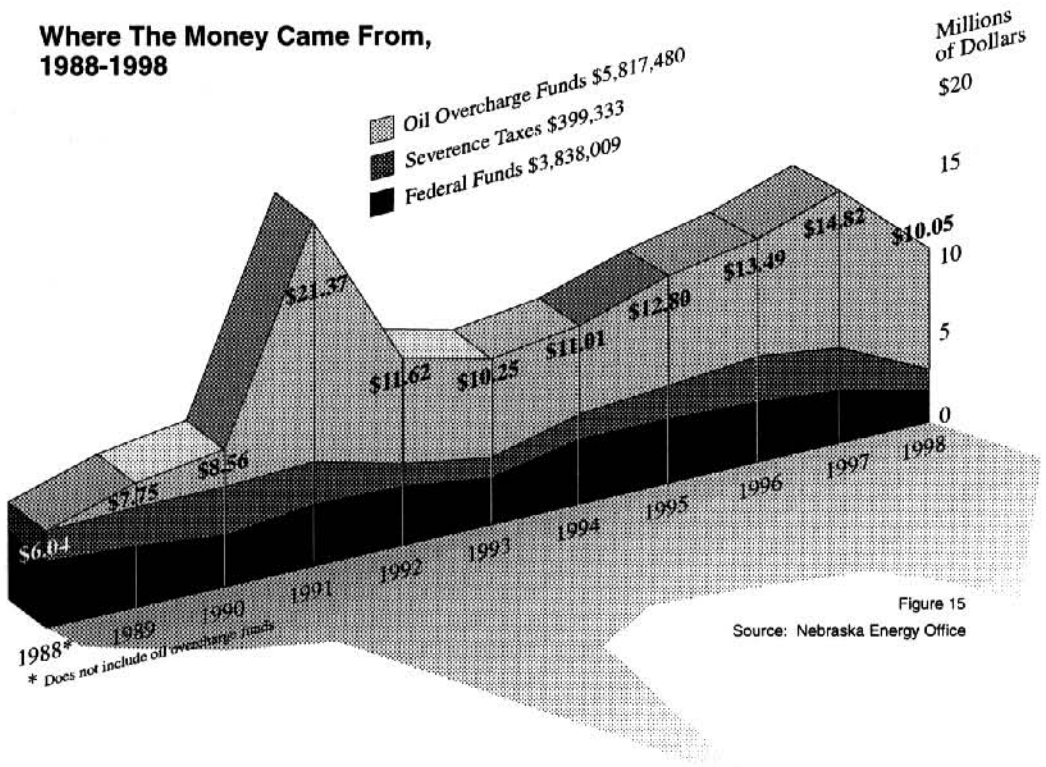
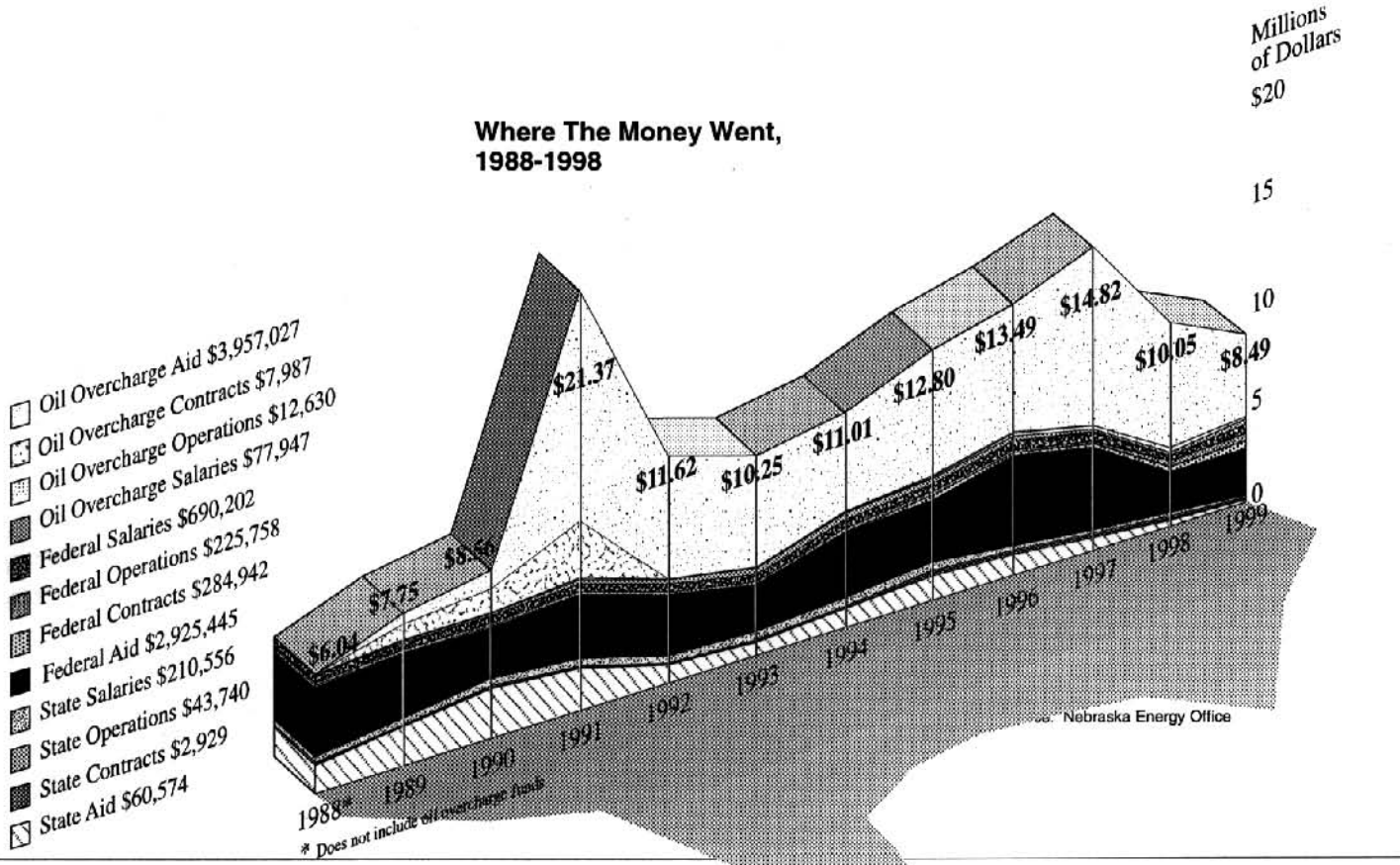


Figure 15

Source: Nebraska Energy Office

Where The Money Went, 1988-1998



Source: Nebraska Energy Office

A full accounting of the Energy Office funds appears in figures 15 and 16.

Overall, the agency spent state, federal and oil overcharge funds in eight different ways. Aid, which makes up the largest portion of the agency's expenditures, consists of money from the three sources which is received and passed on to delegate agencies or directly to beneficiaries such as schools, hospitals, small businesses, local governments and individuals. Money spent for operations pays travel, telephone, computers, salaries and other office expenses.

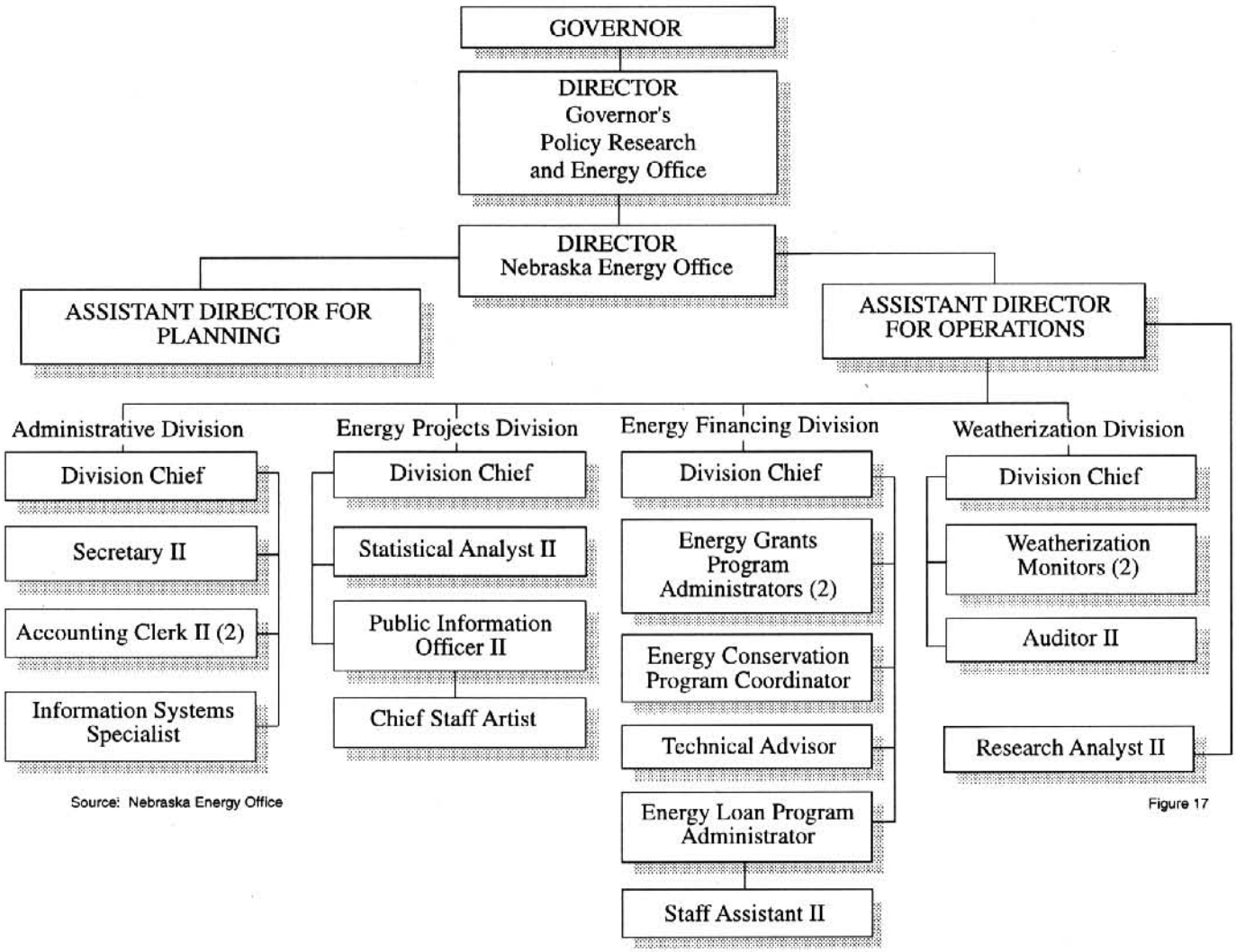
A more detailed accounting of the oil overcharge funds appears on pages 5 and 6.

Organization

The Energy Office was created in November 1973 as the Fuel Allocations Office, a division of the Nebraska Department of Revenue. The agency had independent status from 1977 to January 1987, when it became, by Executive Order of the Governor, a division of the Governor's Policy Research Office.

The organizational chart below (figure 19) shows the functional structure of the Energy Office during the reporting period.

Nebraska Energy Office Organization



Source: Nebraska Energy Office

Figure 17

Issues and Trends

Introduction

At least annually, the Energy Office is required to "identify emerging trends related to energy supply, demand and conservation and to specify the level of statewide energy need within the following sectors: agricultural, commercial, residential, industrial, transportation, utilities, [and] government..." This section addresses those requirements as well as chronicles international, national and state trends and issues.

Energy Costs and Consumption

Nebraska's total energy bill topped $3.5 billion — exactly 3.587 billion in 1997. This was the highest amount ever, surpassing the previous year's $3.456 billion.

The cost of the state's petroleum dependence remained unchanged. A little over half of all energy expenditures — 52.5 percent in 1997 — were for petroleum and its refined products used in the state. Nebraska's petroleum bill for 1997 totaled $1.884 billion.

Energy consumption in terms of British thermal units (BTUs) rose from 580 trillion in 1995 to 630 trillion in 1996 to 705 trillion in 1997. Since 1990 Nebraska's total energy in terms of BTUs rose more than 37 percent. In dollar terms, the amount Nebraskans spend on energy rose more than 15 percent from 1990 to 1997.

Looking at energy use by sector of the Nebraska economy, it is clear that the increase in energy use cut across all sectors — residential, commercial, industrial (including agriculture) and transportation.

The residential sector saw its cost for energy rise from $653.3 million in 1990 to $738.9 million in 1995 to $782.4 million in 1997. Hence, there was about a 20 percent increase in the total money spent by the residential sector on energy from 1990 to 1997.

Total Energy Expenditures, Nebraska, 1970-1997

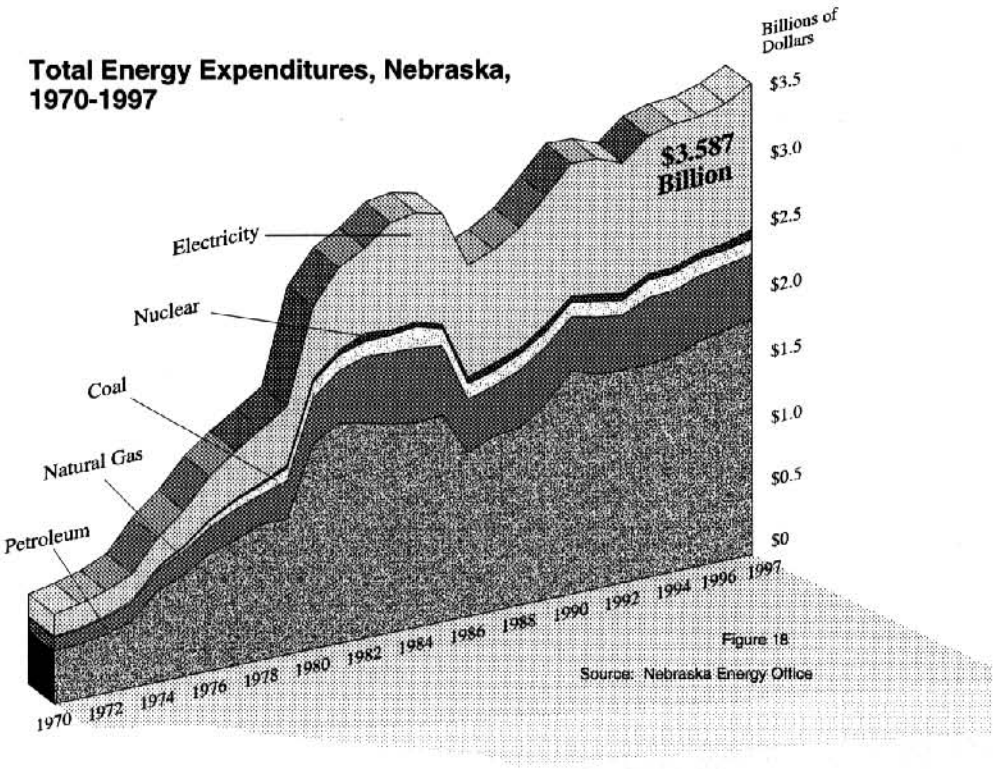


Figure 18

Source: Nebraska Energy Office

In the commercial sector, more than $611 million was expended on energy in 1997. This value represents about an 11 percent increase over the amount expended in 1990.

The industrial sector (including agriculture) expended a total of $653.8 million on energy in 1997. This value represents a 15 percent increase over the sector's 1990 expenditures and a six percent increase of its 1995 expenditures.

By far, the transportation sector consumes the most energy dollars in Nebraska — a total of $1.54 billion in 1997. Its 1997 value is 14 percent higher than its 1990 value and seven percent higher than its 1995 value.

For the most part, Nebraska as a state pays less for energy than other states. Nebraska's total energy prices rank 32nd among U.S. states. Nebraska's electricity prices rank 40th, compared to 23rd for Kansas, 27th for Colorado and 39th for Iowa. Per person, however, Nebraska ranks slightly above average for energy prices at 21st, compared to 19th for Kansas, 48th for Colorado, and 29th for Iowa. Natural gas prices in Nebraska rank 35th, compared to 44th for Kansas, 32nd for Colorado, and 31st for Iowa. Nebraska's electricity prices are among the lowest in the nation. Compared to other states, Nebraska's electricity prices rank 40th, while prices in Kansas at 23rd, Colorado at 30th and Iowa at 33rd rank higher.

Electricity

State Production and Consumption

In 1995, energy use by the state's electric utilities was 270.8 trillion British thermal units, an increase of 12.9 percent from the 1994 total of 236.8 trillion British thermal units, and a new record. Nebraskans paid $1.128 billion for the electricity they used in 1995, an all-time record high and placed the state 36th among the other states in rank.

Electricity produced in the state is generated from coal, nuclear, hydroelectric, natural gas, and petroleum. The first three fuel sources represent the vast majority of electricity

resources used in the state. Natural gas and petroleum for the production of electricity are used primarily for smaller peaking units that generally operate in the summer.

Specifically, net generation of electricity in 1995 increased by 3,332 million kilowatthours from 1994 to 25,279 million kilowatthours, a new record. Electricity from coal, at 16,080 million kilowatthours, accounted for 63.6 percent of the production. Nuclear power, at 7,485 million kilowatthours, accounted for 29.6 percent. Electricity from hydropower units, at 1,426 million kilowatthours, accounted for 5.6 percent of all power production. Natural gas and petroleum accounted for just over one percent. A new source of fuel — shredded tires — accounted for just a fraction of one-tenth of one percent, just slightly less than petroleum used for electricity production.

National Trends

The trend of utility deregulation continues to focus on electric power companies. As with the deregulation that occurred in the natural gas industry, the movement to "unbundle" the electric utility system is coming from two directions — the Federal Energy Regulatory Commission, the Administration and Congress at the national level and state-level public utility commissions. Unbundling would separate a utility's power production, transmission and local distribution systems into distinct entities.

Initially, deregulation would allow the largest electricity users to directly purchase the electricity they need from any producer and ship it over the lines owned by the utilities.

Deregulation is occurring primarily in areas where electric rates are highest, particular New England and California.

Nationally, all eyes were on California which began retail deregulation in March 1998. An estimated 200 different electricity suppliers were competing in the nation's largest market. Nearly $73 million was spent by the state on educating consumers about the coming change. Electric companies spent millions and millions more. According to one newspaper, "consumers yawned." Less than one percent of the state's 10 million electric customers changed utilities. The lack of consumer response led one of the nation's most aggressive electric suppliers, Enron, to abandon further efforts to secure residential customers in California and elsewhere.

Electric utilities in the state are watching national deregulation developments very closely. In 1997, the state's legislature began a multi-year study of deregulation effects on the state's public power system. However, the relatively low cost of electricity in the state may forestall significant changes to the traditional utility structure in Nebraska.

Three issues are linked to electric utility deregulation: how to deal with costs such as power plant construction incurred earlier by utilities for which a rate of return has been guaranteed, minimizing rate shifts from one customer group to another such as from industry to residential customers and how rate competition could undermine energy efficiency and renewable energy growth.

Other national trends emerging during the reporting period included a number of mergers among all utilities and experts suggested the wave of mergers will spread as utilities refocus their business as a result of restructuring. According to an Energy Information Administration report, one result from deregulation could be utility bankruptcies within the next three years because of mandated price reductions. The report predicted the most likely areas for these problems were the Midwest and Middle Atlantic states.

One contradictory trend was noted: there is a rise in consumer interest in purchasing green power from utilities at the same time another green resource, hydroelectric power production, is being reduced as environmental issues outweigh power production. For the first time, the Federal Energy Regulatory Commission ordered the destruction of a power producing dam in Maine to protect endangered species.

Deregulation Issues

Because of Nebraska's unique position as being the only state where all the electric utilities are owned by the customers they serve, utilities in Nebraska are skeptically viewing national deregulation efforts targeted at investor-owned electric suppliers in denser population areas where electric costs are considerably higher.

The road to electric deregulation is traveling along two parallel, but distinct paths: national and state-level. Numerous Nebraska utility executives have expressed concern that actions mandated by Congress could harm the state's unique power system and cause costs to their consumer-owners to rise.

During the reporting period, no legislative progress was made at the national level despite numerous hearings and workshops. All the bills considered in both Houses of Congress died at the end of the 1998 legislative session. Some of the bills called for complete deregulation down to the customer level by 2000. There is growing belief that Congress may only be able to impact minor deregulatory issues since there is little consensus in many areas.

Deregulation of the electric industry is different from earlier deregulation efforts because 25 percent of the nation's electric customers are served by publicly-owned systems. In past deregulation efforts, public ownership was marginal or nonexistent.

It is conceivable that the states taking deregulation steps early will pre-empt Congressional action.

A total of 15 states are in various stages of deregulation of the electric utilities serving those states. Only one of the "low-cost" states, Montana, has opened its electric industry to competition.

In response to deregulation activities in other states, the Nebraska Unicameral and the state's electric utility industry began a three-year, $450,000 state-funded study of the options available to the utilities in a deregulated environment. The first phase

Editorial Voices on Deregulation

"Public power isn't profit-driven; it manages to serve rural residents while keeping rates low in larger communities."

Scottsbluff Star-Herald
March 12, 1998

"Nebraska went with public power for a variety of reasons. In truth, there weren't a lot of takers when electricity was in its infancy for the sparsely populated regions of Nebraska..."

Wahoo Newspaper
March 19, 1998

"Under the best case scenario, Congress would simply stay out of the deregulation issue and let states decide what path to pursue. Barring that, if Congress goes ahead with restructuring, state should be offered an 'option out.'

"That would make the most sense in Nebraska and give the state time to decide whether it wants any part of retail wheeling. Right now, it looks like we have plenty to lose and little to gain."

Columbus Telegram
September 8, 1997

"Governor Ben Nelson has played a valuable role on the national state, protecting the interests of consumers served by public utilities. For example, he was instrumental in the creation of the Governors' Public Power Alliance, which lobbies on behalf of public power."

Lincoln Journal Star
June 11, 1998

of the study, an historical and current view of the state's electric providers, was completed in 1998. The second phase will identify the options as well as what possible legislative action may be required. All parties participating in the study have indicated that even though public ownership of the systems will be examined, potential sale of the systems to private investors will not be an identified option.

While the legislature is studying restructuring issues, the state's largest utilities are cautiously exploring their options. One system sought legislative approval for expansion of services into telecommunications. That approval was denied in the last session of the legislature.

The state's largest system, Nebraska Public Power District, is also exploring realignment of the 200-plus towns it serves at retail. Under consideration is the possibility of transferring retail service for very small towns to rural public power systems or larger municipal systems in the area. Another large utility began offering bill paying insurance to its customers. In Nebraska, the services public utilities may offer is defined in state laws.

October 1997 Storm Damage

A 13-inch-plus snowfall in late October caused massive, lengthy and expensive damage to the electrical systems primarily in 38 counties in southern Nebraska. According to preliminary estimates from the Federal Emergency Management Administration, damage estimates totaled $114 million in the storm-damaged area.

At the height of the electrical outage, more than half of customers in the Omaha Public Power District and Lincoln Electric System territories were without power, an estimated 210,000 customers. According to the utilities, power was fully restored to customers in 8 and 11 days in Lincoln and Omaha, respectively.

"In 11 days, these workers installed more electric line than Omaha Public Power District crews ordinarily string in two years."

Omaha World Herald
November 13, 1997

The cost of the repairs totaled $6.2 million in Lincoln and $12 million in the Omaha area. For both utilities, the storm damage set records: In OPPD's case, the storm was the largest storm outage recorded in the utility's history; in LES' case, the storm was the most expensive, one of the longest to make repairs and involved more customers than ever before. An estimated 1,300 staff and contractors were working on repairs for the utilities at the peak of the outage.

Kingsley Dam Relicensing

The 14-year struggle to obtain a new 40-year renewal of the hydropower dam at Lake McConaughy, north of Ogallala, concluded in July 1998 with the issuance of a license by the Federal Regulatory Energy Commission. More than $40 million was spent on license renewal issues according to the two utilities that operate hydropower facilities on the river.

The Federal Energy Regulatory Commission license to operate the hydropower facility was originally issued in 1941 and expired in 1987. Until the 1998 relicensing, only annual operating licenses were issued pending the resolution of seemingly conflicting issues — irrigation, power generation, recreation, fish and wildlife welfare, municipal interests and flood control.

Resolution was further complicated because the Platte courses through Wyoming and Colorado and actions taken there can have impacts downstream in Nebraska. Since 1994, governors from the three states have had discussions on resolving water and environmental issues and the federal government wants the states' issues resolved before a new license is issued.

A major step in the relicensing process was taken in June 1997: three years of discussions culminated in the governors of Colorado, Nebraska and Wyoming and the Interior Secretary signing an agreement to divide responsibility for endangered species on the Platte River. The federal government has required addressing endangered species issues as a condition to relicensing of the Kingsley hydropower plant and other

Editorial Thoughts on Kingsley

"It's good to know that competing interests can work together, even if the result took much longer than it should."

Omaha World-Herald
January 19, 1998

"...the relicensing agreement heralds a new era of cooperation among those with competing ideas of what the river should be. It's an example of how compromise eventually can be reached even in disputes that drag on for more than a decade."

Lincoln Journal Star
January 21, 1998

"Nebraskans have many challenges ahead on water usage, but the long-awaited agreement between utilities, farmers and environmental interests on the Platte River is a cause to celebrate."

Grand Island Independent
January 22, 1998

"It now seems that everyone has been fairly allocated a share of the Platte's water as well as a fair share of the responsibility for protecting Platte River wildlife. We can remember less than 8-10 years ago when such acknowledgments seemed impossible."

Kearney Hub
January 17, 1998

structures on the Platte River. The cost of the agreement is $75 million, equally shared by the states and federal government. Nebraska's cost is estimated at $15 million.

Other State Issues of Note

◆ **Rates.** According to the Energy Information Agency, electric rates in Nebraska moved from 7th lowest in the nation into a tie for sixth lowest for the first four months of 1997. The data showed the average kilowatthour rate was 4.8 cents in Nebraska, compared to 3.8 cents in Kentucky and Idaho which shared first place.

◆ **Mergers.** During the reporting period, the merger of Northeast Nebraska Rural Public Power District and Wayne County Public Power District became final after approval by the state's Power Review Board. Studies to consider merging McCook Public Power District and Southwest Public Power District were abandoned by utility officials of the two districts.

◆ **Kilowatt Price Surge.** A Midwestern heat wave in June 1998 coupled with planned and unplanned electric plant outages and defaults from other suppliers produced record-setting prices for electricity on the open market. Several utilities reported paying more than $5,000 for a megawatthour. Normal prices for a megawatthour range from $25 to $50. Most of the electricity shortages were concentrated in Illinois, Ohio and Wisconsin. Many observers had been predicting electricity supply problems during peak summertime hours because of the lack of new power plant construction.

◆ **Spalding Dam Restoration.** The state's oldest operating hydroelectric dam completed a $1 million, multi-year restoration of the 1923 historic gem on the Cedar River.

◆ **Power Lines and Leukemia.** A long-awaited, eight-year study by the National Cancer Institute and leading childhood leukemia experts concluded that children living near high voltage power lines do not develop leukemia at rates greater than those living in other areas of the nation.

◆ **PC Week Award for Nebraska Utility.** *PC Week*, a computer magazine, ranked Nebraska Public Power District 66th among 500 companies in its use of computer-based technology. The ranking was earned because of the utility's use of internal and external reliance on electronic mail to keep employees and customers informed.

◆ **Space-age Fuel Cell Comes Home.** For the first time, a fuel cell was installed in a house as a test of providing an in-home power generation system. Until this experiment, fuel cells were impractical for use because of size and cost, except for use in space. Fuel cells are small chemical plants that can use fuels such as hydrogen or methanol to produce electricity.

◆ **Windup Technology a Hit.** Reaching back to the technology that put victrolas in homes at the turn of the century, an English inventor created a windup radio that can operate for 40 minutes after 30 seconds of cranking, eliminating the need for electricity and batteries. The windup radio may be joined by windup flashlights in the near future. The firm plans on producing 500,000 radios in 1997.

Nuclear Power and Nuclear Waste

State Production and Consumption

Nuclear generated electricity in the state in 1997 declined by two percent from 1996 levels. A total of 9,269 million kilowatthours were produced by the state's two nuclear generators in 1997, marginally down from the 9,457 million kilowatthours produced in 1996.

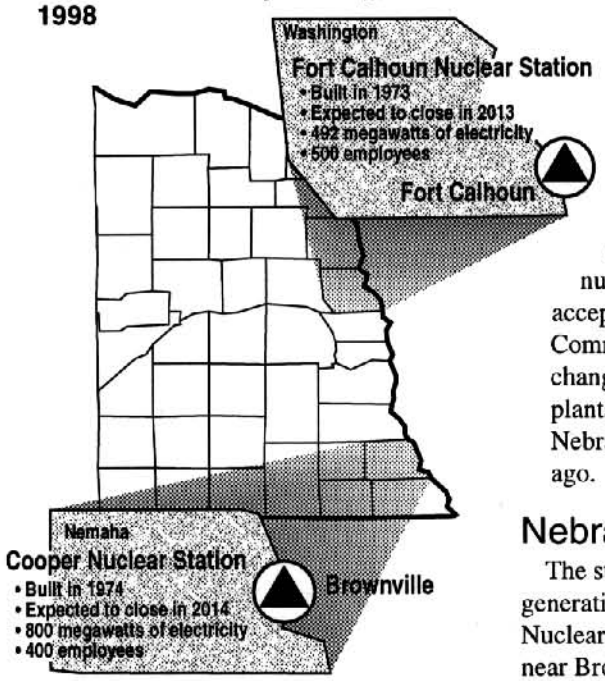
Nebraskans paid an estimated $58 million in 1997 for the nuclear generated electricity used in the state, up from $54 million in 1995.

About one-third of all electricity used in the state in 1997 came from nuclear power, little changed the 1996 level of 34.6 percent.

National Trends

While the United States has the greatest nuclear capacity in the world, future capacity is expected to decrease over the next decade. By 2010, America's nuclear

Nebraska Nuclear Power Plant Locations by County, 1998



Source: Nebraska Energy Office Figure 19

capacity will decline from 99 gigawatts to about 93 gigawatts as older units are deactivated. A gigawatt is one million kilowatts. Premature closing of some nuclear units because of deregulation could accelerate this trend.

The nuclear power industry has stalled in America because of three factors: high operating and construction costs relative to other fuel sources and unsolved nuclear waste disposal. No new nuclear power plants are planned.

Other highlights during the period:

- With the era of electric industry restructuring progressing in states with high-priced electricity costs, the rumored early closure of expensive nuclear power plants began in 1997. During the reporting period, operators of three nuclear generators announced their closure, including two of the largest operated by the nation's biggest atomic utility. When closed, more than 2,810 megawatts of electricity will be shutdown. Regulators may have to resolve the unfunded decommissioning costs associated with early closure of the plants.
- In December 1997, the Nuclear Regulatory Commission levied the largest fine, $2.1 million, against the operator of three nuclear power plants in New England. The fine and others like it across the nation, put nuclear utilities on notice that past operational methods used in nuclear plants were no longer acceptable. Increasingly, the Commission is forcing utilities to change the management climate at the plants much like the Commission did at Nebraska's Cooper Station several years ago.

> "Given the record of management at the nuclear plant, the apparent relapse by the utility is genuinely alarming. Although ratepayers have been relatively passive while the Nuclear Regulatory Commission took stern action, it may be time for that to change. Ratepayers are the owners of the utility. They have the authority and the right to shake up the place. A nuclear power plant generates awesome power. Nebraska Public Power District ratepayers should insist on a safety record that is above reproach."
>
> Editorial, *Lincoln Journal Star*
> December 13, 1998

Nebraska Nuclear Facilities

The state has two nuclear power generating facilities — Fort Calhoun Nuclear Station operated by Omaha Public Power District and Cooper Nuclear Station near Brownville operated by Nebraska Public Power District. Fort Calhoun is one of the older commercial nuclear facilities still operating in the nation.

State Trends

No new nuclear facilities are planned for construction by utilities in the state due to cost inefficiencies and unsolved storage issues for low- and high-level waste.

In April 1998, the *Omaha World Herald* provided a detailed look at the state's nuclear power plants' past and future. In inflation-adjusted dollars, the construction of Fort Calhoun cost $650 million and Cooper $1.2 billion. Projections by the utilities have estimated decommissioning costs at $854 million and $819 million, respectively. Decommissioning fees are currently being collected from ratepayers and invested. The two utilities expect investment earnings to pay for half to two-thirds of the decommissioning costs.

Highlights during the reporting period:

- In August 1997, the utility that operates the Fort Calhoun nuclear generator was fined $55,000 by the Nuclear Regulatory Commission for violations of fire protection requirements at the plant. In October 1997, a second fine of $110,00 was levied by the Commission for a safety misstep by utility personnel at the plant. A Commission review in September 1997 of plant operations rated performance as superior in engineering, but lower in other aspects of the operations.
- In July 1997, the Utility Data Institute ranked Cooper Nuclear Station as the 25th lowest in operating costs in 1996 among the nation's nuclear plants. In December 1997, the Regulatory Commission fined NPPD $110,000 for safety problems at Cooper.

Nuclear Waste

The majority of nuclear waste in the state is produced by the two nuclear power stations. For storage purposes, radioactive material is classified as high- or low-level waste depending on the length of time the waste remains radioactive.

High-level waste is spent nuclear fuel and has primarily been stored on site at the nuclear power plants awaiting construction of a temporary or permanent repository. Fort Calhoun has storage capacity until 2007. The Cooper station expects to exhaust on-site storage by 2004 or later.

Permanent High-Level Waste

The *Nuclear Waste Policy Act*, passed by Congress in 1982, set forth the storage options for the radioactive waste:

- Defense Department radioactive waste would generally be segregated from commercial radioactive waste and stored at the Waste Isolation Pilot Plant in New Mexico.
- A permanent storage facility would become the final repository for spent nuclear fuel from commercial reactors. By 1998, the U.S. Department of Energy was supposed to start picking up the waste from nuclear reactors and move it to the permanent site. In 1987, Congress selected Yucca Mountain, Nevada, as the most likely site, if found suitable, for spent nuclear fuel from the nation's 109 reactors.
- If needed, a temporary radioactive waste storage facility, called monitored retrievable storage, would be located at an undetermined site.

To finance the Yucca Mountain site, utilities with nuclear generators have been paying one-tenth of a cent per kilowatt-hour produced by the reactors. As of mid-1996, more than $140 million has been paid by Nebraskans into the nuclear waste fund.

Proposed Nuclear High- and Low-Level Waste Storage Sites in the U.S.

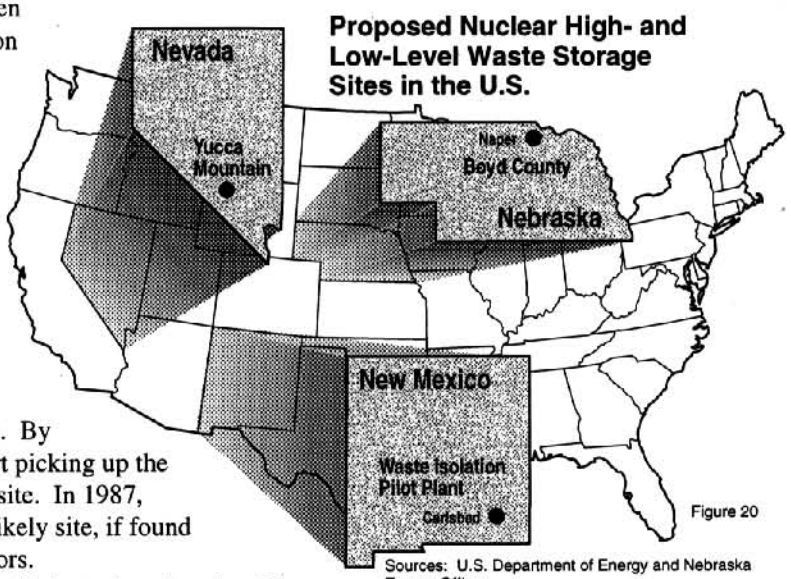


Figure 20

Sources: U.S. Department of Energy and Nebraska Energy Office

Waste Isolation Pilot Plant

The furthest developed facility, the Waste Isolation Pilot Plant, was begun in 1983 near Carlsbad, New Mexico. Designed to store radioactive wastes resulting from the production of nuclear weapons, it is also a test of the use of prehistoric salt beds to entomb radioactive waste. This waste will remain deadly for 240,000 years.

The $2 billion, 20-year project was expected to open in May 1998 and begin accepting 50 years of nuclear bomb wastes contained in 850,000 drums. Legal challenges have delayed the opening until at least 1999. Around 2033, the plant will be permanently sealed.

Yucca Mountain

Since the selection of Yucca Mountain, the federal energy agency has faced both technical problems and local opposition. While site testing continues, the revised operational date of 2010 may again be postponed. More than $3 billion has been spent to date evaluating the proposed site. Of the $14 billion collected from ratepayers, $3.7 billion remains unspent. About $500 million is collected annually.

Since 1995, both houses of Congress have attempted to make the selection of Yucca Mountain permanent. However, the opposition by Nevada, as well as others, has prevented this from happening. During the reporting period, the two houses of Congress could not reconcile differences on selection of Yucca Mountain as a permanent site. As more and more nuclear plants exhaust on-site storage, the issue of temporary storage will become one of greater concern. Already, ten plants have exhausted on-site storage and 26 plants will lack storage by the end of 1998.

In July 1994, the U.S. Department of Energy was challenged in two separate lawsuits to provide a storage site by 1998, the original operational date for permanent storage. Forty-two utilities and 35 public agencies filed legal action against the federal energy agency. Nebraska joined the public agency lawsuit on behalf of the state's ratepayers who had contributed to the construction fund for the storage facility. The U.S. Circuit Court of Appeals declared in 1997 that the U.S. Department of Energy must begin accepting waste in 1998. How the federal agency will accomplish this is unknown at this time. The agency may be required to reimburse the utilities for the storage costs.

In June 1997, scientists studying Yucca Mountain determined that rain from 40 years ago or less had seeped from the top of mountain to 800 feet below where nuclear waste storage has been proposed. Scientists also found evidence of rain that seeped into the storage area 5,000 to 20,000 years ago. These new findings could further delay the selection process. The best estimate for opening the permanent storage facility at Yucca Mountain is between 2010 and 2013.

Monitored Retrievable Storage

Temporary storage of spent nuclear fuel was also listed as a possibility in the 1982 law if a permanent facility was not operational by 1998.

According to the Edison Electric Institute, an estimated 35 nuclear plants will exhaust their on-site storage of radioactive waste by 2007, including the two plants in Nebraska.

Action during the reporting period on this type of storage focused on not one, but three storage options: a government-operated facility, a private one operated by utilities and actions being taken

individually by utilities that have exhausted on-site storage options.

A Native American tribe, the Skull Valley Band of Goshutes in Utah, has shown the most interest in developing temporary storage of nuclear wastes that is government-operated. According to the nation's nuclear waste negotiator, an environmental impact assessment of the site at the Goshute reservation is being conducted and should be completed in two years.

Transporting Nuclear Waste

Whether high-level waste is civilian or military, it must be moved from where it was produced to temporary or permanent storage sites. Because many nuclear facilities are east of Nebraska and likely storage areas are west of the state, rail lines and highways in Nebraska are probable corridors for shipments of radioactive waste. One nuclear group estimated that 15,000 truck or rail shipments would be needed over the next 30 years to move the waste from generators to storage sites. As many as 12,000 of those shipments could pass through Nebraska. According to the Nebraska State Patrol, currently only one or two shipments a month pass through the state.

Permanent Low-Level Waste Storage

Nebraska belongs to one of nine regional or state compacts in the nation formed to develop storage facilities for low-level radioactive waste. Low-level waste is generally composed of clothing, filters, resins, tools and other items from nuclear power plants and hospitals. According to the U.S. Department of Energy, utilities generate more than 50 percent of the low-level waste. In Nebraska, it is estimated that utilities generate 90 percent of the low-level waste. Low-level waste remains radioactive for 90 days to 200 years, according to experts.

Boyd County Radioactive Waste Storage Facility and Related Issues

Since Boyd County, Nebraska, was selected in 1988 by its regional compact, the Central Interstate Low-Level Radioactive Waste Commission, and the developer, U.S. Ecology, the building of a low-level radioactive waste facility has progressed along a predetermined number of stages. The facility is now estimated to cost $153 million, more than five times the original estimate of $30 million. The facility, if built, is expected to be operational in 2000. As of October 1997, $85 million had been spent on siting and licensing issues.

Until a regional facility is operational, the two Nebraska utilities store waste on site or send the waste to a facility in Barnwell, South Carolina. The South Carolina facility was briefly closed in 1995, but reopened in mid-1996 and is expected to remain open for seven or eight years. However, the landfill's operator warned in 1997 that shipments to the site were declining to a level that may require the facility to close ahead of schedule due to unfavorable economic conditions.

The state's Department of Environmental Quality completed its review in October 1998 of the application to build a site in Boyd County. The state agency found 29 areas in which the proposed site was deficient. The next phase of the review process involves a series of public hearings. Final license decisions could extend into 1999 or 2000.

Throughout the reporting period, Nebraska Public Power District, one of the utilities financing the site, considered and rejected a proposal to stop funding the project.

Also, some Compact members and Nebraska disagreed over the pace of the license review.

In 1998, the Legislature defeated an attempt to withdraw from the multi-state compact if the building of a Nebraska site was begun before 2008.

According to the Associated Press, as of July 1998, more than $400 million had been spent on planning, research and other issues without a single new repository opening at any one of the 15 proposed locations across the nation.

Natural Gas

State Production and Consumption

After peaking in 1973 at more than 230 trillion British thermal units, Nebraska's natural gas consumption has plummeted by nearly half to 134.1 trillion British thermal units in 1996. The 7.3 percent rise in natural gas use over 1994 was due primarily to weather.

Natural gas expenditures in the state totaled an estimated $507 million in 1995, still below the peak of $567 million in 1984, and an increase of 1.4 percent from 1994.

A small amount of natural gas is mined in the state — less than two percent of that used in a year. A production surge that began in 1993, peaked in 1994 and declined in subsequent years. Natural gas production totaled 1.66 billion cubic feet in 1997, a decline of 11.3 percent from the nearly 1.87 billion cubic feet produced in 1996.

The all-time production low in Nebraska was in 1991 when 784 million cubic feet were mined. Most of the state's production is confined to seven counties in the Panhandle as shown in figure 21. More than 78 percent of all natural gas production in the state in 1997 came from Cheyenne County. Without any new natural gas field discoveries, the state's production levels should gradually decline over time. Given those prospects, nearly 100 percent of the state's natural gas needs in the future will come from imports.

Nebraska Natural Gas Production by County, 1997

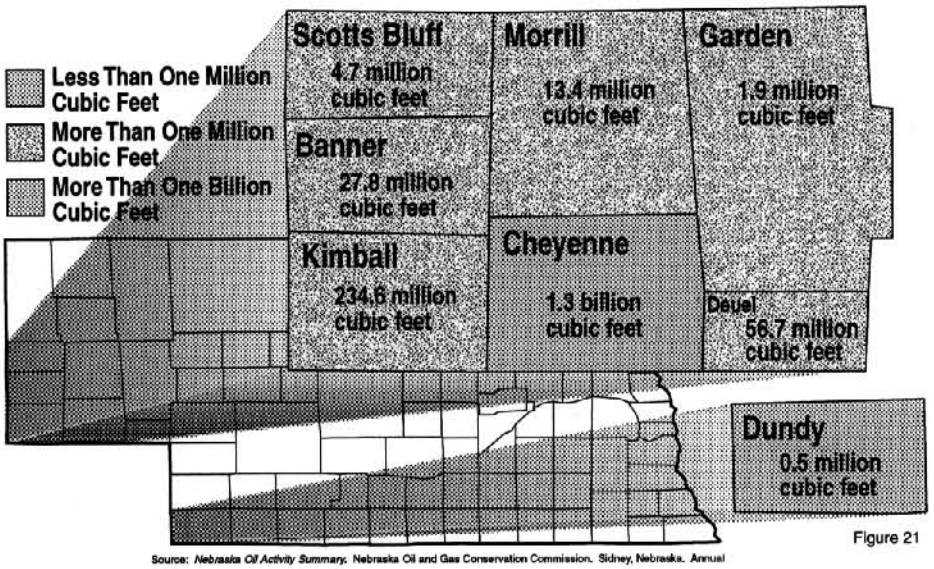


Figure 21

Source: *Nebraska Oil Activity Summary.* Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska. Annual

Total 1997 Natural Gas Production 1,669,685,000 Cubic Feet

National Trends

Two natural gas trends, reported in previous *Annual Reports*, continued: the spreading impacts of industry deregulation as a result of Federal Energy Regulatory Commission Order 636 and consolidation of the industry at all levels.

Order 636 fundamentally changed the natural gas utility industry. Securing supplies of natural gas became the responsibility of local utilities, with pipelines reverting to a common carrier status. The effect of the "unbundling" of services forced utilities to deal with every leg of the fuel's travel, from well-head to the customer's door. In the past, utilities relied on a regulated system to guarantee an adequate supply for their customers. With the regulatory safety nets stripped away, utilities must purchase the right amount of gas for the right customers. The new system will also cause a shift in costs according to the *Wall Street Journal*. Individual homeowners and small businesses will pay more, while big industrial customers will be able to negotiate for lower costs.

In October 1996, the *New York Times* reported that 12 states had opened part or all of their natural gas industries to competition and that 15 other states were considering all or partial deregulation. According to *Natural Gas 1996: Issues and Trends* published by the Energy Information Administration, the 10-year old restructuring of the natural gas industry, "is far from complete. Average inflation-adjusted gas prices have fallen for all types of consumers. Electric utility purchases show that prices to this group have fallen by more than a third between 1990 and 1995. However, residential and commercial customers, most of whom still purchase bundled gas services from regulated franchised distribution companies, on average experienced relatively modest real price declines of about ten percent." The report states that only now are states beginning to address service choice issues for smaller customers.

State Trends

The ramifications of Federal Energy Regulatory Commission Order 636 continued to resonate throughout the state. The state's largest users of natural gas have always been able to secure the gas they need from sources other than local providers.

Customer groups such as motels, restaurants or schools and local government groups are finding that by using a third party to secure natural gas supplies, they can save from five to 17 percent on their natural gas bills. For the first time, these smaller commercial operations are reaping the benefits that previously only larger firms could realize.

Even a number of smaller cities — Auburn, Fairbury and Wahoo — have become a "customer group" capable of supplying natural gas to larger users within their jurisdictions. This form of service is called "aggregation."

Aggregation of natural gas customers enveloped another group of customers — residential ones — in Dakota City and South Sioux City. In December 1996, both towns became aggregators for all the customers in their respective towns, purchasing natural gas from the Nebraska Public Gas Agency and not the local supplier, Mid America Energy. According to the Nebraska Natural Gas Agency, 32 towns in the state have become aggregators.

Another facet of deregulation, choice of natural gas suppliers for small users was offered by KN Energy in 1998 to most of the utility's customers. More than 160 of the 185 towns served by KN Energy modified the utility's franchise to allow supplier choice by retail customers within each town's jurisdiction. More than 40 of the towns served by KN also joined the Public Alliance for Community Energy or PACE, a group of cities offering to supply natural gas to customers. KN Energy allowed customers four choices of natural gas supplier: KN Services, PACE, United Gas Service and KN Energy. According to KN, customers voted accordingly: 69 percent for KN Services, 27 percent for PACE, 4 percent for KN Energy and less than .5 percent for United Gas Services.

A different choice option was offered by the other major utility serving Nebraska. Peoples Natural Gas gave customers price options, not supplier

options. The options included: fixed price, capped index, weather guaranteed and traditional portfolio. Most customers opted for the traditional portfolio.

Finally, the turf wars of the early 1990s between Peoples Natural Gas and Metropolitan Utilities District resumed during the reporting period. The two utilities were competing in western Douglas County to serve customers that were exempt from franchise agreements.

Other Issues of Note

- **Acquisition of Systems.** Throughout the reporting period Wahoo continued the acquisition process of its natural gas system from Peoples Natural Gas approved by voters in November 1996. A three judge panel set the acquisition price at $1.2 million plus more than $266,000 for accounts receivable. Wahoo is expected to acquire the system in August 1998.

  Scribner, which also approved acquisition of its natural gas system from Peoples the same time as Wahoo, was entering the judicial phase in mid-1998.

  In May, Neligh voters narrowly approved acquiring its system from KN Energy.
- **Industry Mergers Continue.** In late 1997, Williams Pipeline Company, a major natural gas transporter in Nebraska purchased Mapco, a major transporter of propane and butane.
- **Natural Gas Production to Soar.** In mid-1997, both the *New York Times* and *Wall Street Journal* reported on significant international trends in natural gas production. After years of neglecting natural gas resources, Persian Gulf countries are now concentrating on increasing production. World-wide production of natural gas is increasing at twice the rate of petroleum and also faster than consumer demand. The Middle East contains one-third of the world's known gas reserves, but currently has a market share of just seven percent. Countries in the region previously ignored these resources because oil production was more profitable, but now oil reserves in some countries are diminishing rapidly.

Crude Oil Production, Nebraska, 1939-1997

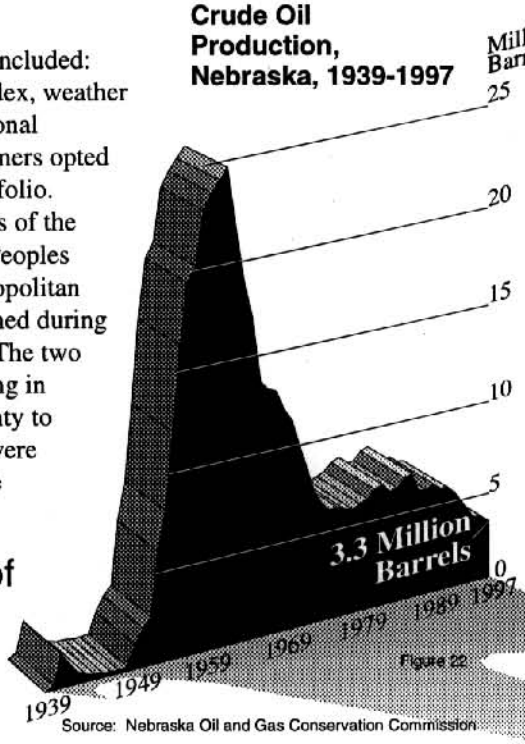


Figure 22

Source: Nebraska Oil and Gas Conservation Commission

Petroleum

State Production and Consumption

Oil production in 1997 in the state dropped for the eighth consecutive year. The 3.33 million barrels pumped represented a six percent drop from 1996 and a new modern-day low. Figure 22 illustrates the state's oil production history since 1939.

The last time oil production was this low, 1952, the state's first oil well was just a teenager. Only 1,800 barrels were pumped in 1939, the year of the first oil strike in the state. By 1952, production had risen to 2.68 million barrels. None of the oil mined in the state has been refined in Nebraska since the last refinery closed in the 1980s.

Oil is produced in only 17 of the state's 93 counties and two counties, Hitchcock and Kimball, produced half of all the oil pumped in 1997. Figure 23 indicates the oil-producing counties in Nebraska.

It appears that even the use of advanced oil recovery technology, where practical, will not reverse the state's oil production decline.

An estimated 40.4 million barrels of oil were consumed in the state in 1995, up 1.5 percent from the year before. Less than ten percent of the oil used was produced in the state. As a result, more and more of the state's petroleum needs are being met by other states and countries.

Nebraska Crude Oil Production by County, 1997

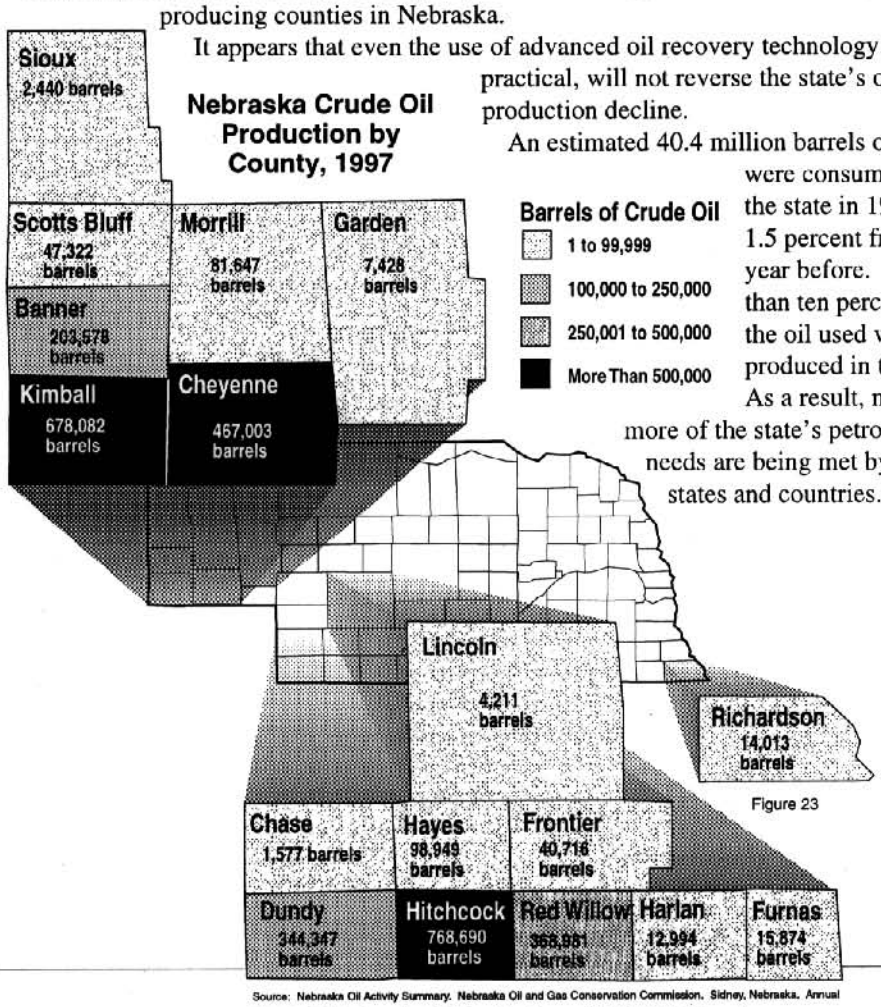


Figure 23

Source: Nebraska Oil Activity Summary. Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska. Annual

Total 1998 Crude Oil Production 3,175,852 Barrels

National Trends

The state's oil dependence is increasingly being paralleled by the nation. According to the Energy Information Administration, net imports provided 48 percent of the nation's oil needs in 1996. Oil production in the nation continued the long decline begun 1954, but production has somewhat stabilized, in part, due to technological advances in oil production.

The conservation gains made in the 1970s that reduced the nation's reliance on imported oil from 45 to 32 percent by 1985 have been wiped out by the return to consumptive energy habits and growth in the economy.

Other trends indicate America will remain dependent on others to meet its petroleum needs — primarily for transportation — into the foreseeable future:

- According to the American Petroleum Institute, during the first eight months of the year, America's top five sources of petroleum products were: Venezuela, 16.2 percent; Canada, 15.5 percent; Saudi Arabia, 14.4 percent; Mexico, 12.9 percent; and Nigeria, 7.3 percent. For the same period, Persian Gulf countries supplied nearly 20 percent of the nation's imported oil. As noted last year, crude and refined oil products from Western Hemisphere nations will likely continue to provide a greater portion of the nation's oil needs than Persian Gulf countries. Of particular note is the rise of Canada as one of the top suppliers of imported oil. The increase is due to the start of production from the Hibernia field off the coast of Newfoundland.
- During the reporting period, considerable attention by oil companies, national governments and the media was focused on potential energy deposits in countries that ring the Caspian Sea. Some experts have speculated the region's oil and natural gas reserves may be second only to those in the Persian Gulf. However, moving the energy resources from the region to energy-consuming markets is very problematic and expensive. Three former Soviet states — Azerbaijan, Kazakstan and Turkmenistan — border the Caspian Sea as well as Russia and Iran. One of the key concerns has been through which nations any proposed pipelines will be laid and who will finance construction of those lines. The Unites States prefers a pipeline that runs from Baku in Azerbaijan to Ceyhan, Turkey and crosses Georgia, but avoids Russia and Iran. Unfortunately, the proposed route is the most expensive, costing an estimated $3.8 billion. The Caspian Sea region is also politically volatile with numerous historic animosities among the indigenous peoples.
- Despite the fact that only one-fifth of America's imported oil comes from the Persian Gulf, Americans should expect a sizeable U.S. military force to remain stationed in the Persian Gulf region for years to come. This quasi-permanent deployment costs an estimated one-fifth of the Pentagon's yearly budget, about $50 billion. The military presence in the Gulf has been justified for a number of reasons: to contain Iraq, to protect American interests in the region and to provide stability in an area containing an estimated 70 percent of the world's oil supplies. As noted last year, the region's stability is deteriorating and threats to military personnel are increasing. The marked decline in the price of oil during the reporting period is adding economic stress to countries in the region.

  Again in late 1997, the United States and some allies increased their presence in the Persian Gulf as tensions flared with Iraq, a pattern that has been repeated many times since Iraq's defeat in 1991.
- The volatility and unpredictability of oil prices were on display throughout the reporting period. The fall of 1997 saw rapidly rising prices — a gallon of gasoline leaping 15 cents — only to plunge by 40 percent and more within the next several months. By February 1998, gasoline was selling for less than $1 a gallon at some Nebraska stations.

  With the collapse of Asian economies, an overabundance of oil supplies forced prices to levels not seen in decades. Those oil-producing nations that have come to rely on oil revenues to finance a major portion of their governmental and societal expenses were experiencing economic distress which could easily lead to political unrest, especially if oil prices remain low for the duration of Asia's economic malaise which could continue for several years.
- Americans love affair with gas-guzzling vehicles, especially vans, trucks and sport utility vehicles continued unabated during the period. Because these vehicles get fewer miles to the gallon than cars, observers have cautioned that America's dependence on imported oil to meet its transportation needs will continue into the near-term future.

State Trends

As noted in the section on Nebraska production, the state's ability to produce oil is diminishing, especially so long as price volatility remains a factor in crude oil markets. Because a significant portion of the state's oil is thousands of feet below ground, production costs are considerably higher: a Nebraska oil company stated several years ago that it cost around $20 to produce a barrel of oil in the state; costs in Saudi Arabia average $2 a barrel. So long as petroleum costs remain in the $10-$16 range or lower, a resurgence in oil drilling and production in the state should not be expected.

According to CCH, Inc., in August 1997 Nebraska's gasoline tax of 24.8 cents a gallon ranked 5th highest among the states.

Alternate Energy

Efforts to develop clean, abundant and affordable alternates to the use of fossil fuels have been aided by five factors — technological improvements, increasingly stringent environmental laws, federal research funding, utility regulators and broad-based public support. Because Nebraska is a public power state, utility regulators are not considered a factor in fostering the growth of alternate energy forms in the state.

The five main alternate energy sources — biomass, geothermal, hydropower, solar and wind — are detailed in this section.

State Production and Consumption

In 1995, hydropower supplied an estimated 2.5 percent of the total energy consumed in Nebraska. Biomass, including ethanol, supplied 1.2 percent in 1995. The Energy Office estimates in 1995 all five forms of alternate energy supplied approximately four percent of the energy used.

While energy production from alternate energy sources is increasing, the increases are generally very small.

National Trends

According to the Energy Information Administration in its *Renewable Energy Annual*, eight percent of the nation's total energy needs were met by renewable energy resources in 1996, the most recent year available.

More than half of the renewable energy came from hydroelectric resources, followed by biomass (41 percent), geothermal (five percent) and solar and wind (less than one percent each).

State Trends

As indicated above in "State Consumption and Production," alternate energy production and use have remained fairly constant over the years, despite the state's overall growth in energy consumption.

In the near term, only marginal growth in alternate energy resources is foreseen. Increases are likely in biomass-to-ethanol production, wind-to-electricity production and solar photovoltaic utilization. These trends are expected to continue into the future unless renewable energy production becomes adopted as part of restructuring of the electric industry. In that case, growth in energy from alternate sources could increase dramatically.

Fuel Source Types

Biomass

While most of the emphasis on biomass energy sources continues to focus on fuels of the future — switchgrass, genetically-engineered trees, garbage and crop wastes — the reality, in Nebraska, is that wood remains the primary alternate biomass fuel in use today, followed by corn used for ethanol production. Ethanol production information is summarized on page 15.

In northeast Nebraska, several groups continue to examine the feasibility of growing switchgrass to use as feedstock for an ethanol plant.

Use of soybeans as a diesel fuel additive is experiencing some growth due to demonstration use in state Department of Roads trucks in Nebraska and Iowa. One bushel of soybeans can produce 12-13 pounds of oil. However, the fuel is not cost competitive with diesel fuel at this time. Until production costs are reduced, only limited amounts of this fuel are expected to be produced and used.

Geothermal

Geothermal energy use in Nebraska remains limited to small-scale systems such as ground-source heat pumps used in schools, businesses and homes.

Hydropower

Hydropower in the state comes from two sources —11 hydroelectric dams in or on the border of the state and power supplied to Nebraska by Western Area Power Administration. The power administration transfers hydroelectric power produced in western states to state agencies, municipalities and public power districts. Taken together, all hydroelectric sources met about 14.7 percent of the state's electricity needs in 1995. Nationally, about four percent of the country's electricity needs were met through hydropower in 1996.

In 1997, Western Area Power Administration provided 2,814,536 megawatthours to municipally-owned systems, rural districts, state agencies and regional public power districts. A megawatthour is one million watthours of power. The value of the hydroelectricity was $50.3 million.

> "The wind that blows over the plains is like a great river of air, flowing with enough force to generate significant amounts of electrical power. If a cost-efficient method of harnessing this power could be developed, it would be beneficial."
>
> Editorial, *Omaha World Herald*
> December 27, 1997

At this time, it is not anticipated that other sources having hydroelectric potential will be developed in the state. It is more likely that hydro resources will decline with time. For example, resolution of the relicensing of Kingsley Dam may result in a reduction in the production of electricity.

Solar

Solar or photovoltaic energy continued to make significant technological gains in reducing the cost of electricity from this power source. In 1996, three American solar panel production facilities came on line and six more plants are scheduled to begin operation in 1997.

Electricity produced from solar power is expected to cost 12 cents per kilowatt. Currently costs are estimated at 18 cents a kilowatt, down from $2 a kilowatt in 1976.

The worldwide market for solar is greater outside economically developed countries, especially where infrastructure is non-existent. An estimated one-third to one-half of the world's population currently lives without electricity. In 1995, solar power worldwide grew 18 percent and is expected to grow annually by 20 percent through 2000, according to industry sources.

Nationally, less than one percent of the electricity used comes from solar sources. However, use of solar technology in other areas of the world is expanding dramatically. Between 1992 and 1996, the United States more than doubled the production of solar cells and modules to 36 megawatts. The vast majority of these products are exported to European, Asian and Third World countries.

The key to advancing solar technology remains moving from a one-of-a-kind prototype to mass production. When solar cells are mass produced, the cost of production plummets. For example, if the technology used in the prototype tests could be mass produced, it has been estimated that electricity from the solar cells could be produced for 5.5 to 6 cents per kilowatt, including one cent for maintenance. However, this is still above current Nebraska electricity production costs, but well below the national average price of eight cents per kilowatt.

Current, cost-effective use of solar cell technology in Nebraska is primarily limited to the powering of electric fences by cattle producers. However, solar water pumping technology — both installed and portable — is becoming more available.

Solar photovoltaic arrays are currently being used by state government at one interstate reststop and on several highway information signs.

Northwest Rural Public Power District, based in Hay Springs, has conducted practical consumer-based photovoltaic research since 1991. The utility has found solar panels used for water pumping to be cost competitive in certain settings, especially when more than 325 feet of electrical lines need to be constructed. Solar panels have also been used to replace broken windmills. According to utility personnel, more than 1,000 windmills are still in use by customers. The District leases the solar panels to customers for a period of one year, charging only the cost of the system, not for the power generated by the solar panels. The District leases more photovoltaic systems per customer than any other utility company in America.

Wind

According to the Energy Information Administration, four countries — the United States, Denmark, Germany and India had 76 percent of the world's generating capacity from wind resources in 1997. Worldwide, wind generated electricity is experiencing an annual growth rate of 25 percent. Some experts predict that wind resources could provide nearly 10 percent of global electricity demand by 2017.

In 1996, more than 5,000 wind turbine clusters were generating electricity in Iowa, Minnesota, New York and Texas. California, which leads the nation with 15,000 turbines, produces about one percent of the electricity it uses from wind.

In the Midwest, studies by the Union of Concerned Scientists has estimated that wind resources in the state were sufficient to supply 120 times the amount of electricity currently being used in Nebraska — the equivalent of seven percent of the electricity used in the nation.

Not waiting for a multi-year wind study to be completed (see page 14 for more details), six Nebraska utilities decided to proceed with construction of two 750 kilowatt units near Springview. The wind turbines will be the largest ever built in North America and will generate enough electricity to supply the needs of 350 homes. About half of the $2 million project is being paid for by the U.S. Department of Energy. The six utilities — Nebraska Public Power District, Lincoln Electric System, Municipal Energy Agency of Nebraska, the cities of Grand Island and Auburn and KBR Rural Public Power District — will share the remaining costs.

In early 1998, Lincoln Electric System announced the utility would build a $1 million, 750 kilowatt wind turbine north of the city. Utility customers could buy small amounts of wind generated electricity for an additional $4-$6 a month. At the end of the reporting period, more than 1,500 customers had requested the wind energy, including several state agencies. A gubernatorial executive order encouraged state agencies to utilize renewable energy options where practical and cost-effective.

Energy Statistics

Consumption

The source for the following information is the *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Pages as noted.

Consumption and Ranking by End-Use Sector, 1995

(Page 17)

Sector	United States Trillion Btu	Nebraska Trillion Btu	Rank
Residential	18,056.5	133.0	35
Commercial	13,943.8	120.1	32
Industrial	34,477.8	159.6	44
Transportation	24,071.6	167.6	38
Total Consumption	90,549.7	580.3	37

Consumption and Ranking by Source, 1995

(Page 18)

Sector	United States Trillion Btu	Nebraska Trillion Btu	Rank
Coal	19,673.2	179.5	32
Natural Gas	22,189.1	133.7	37
Petroleum	34,663.9	218.5	39
Electricity	10,281.3	71.3	35

Consumption and Ranking Per Capita, 1995

(Page 18)

United States Million Btu	Nebraska Million Btu	Rank
344.4	354.0	23

Consumption by Resource

(Trillion Btu - Page 9)

Year	Coal	Natural Gas	Petroleum	Nuclear Electric Power	Hydro-Electric Power	Biofuels	Net Interstate Flow of Electricity	Total Energy
1994	160.3	124.8	215.7	67.7	13.5	5.7	- 27.6	558.7
1995	179.5	133.7	218.5	79.8	14.7	7.0	- 51.0	580.3

Consumption by End-Use Sector

(Trillion Btu – Page 9)

Year	Residential	Commercial	Industrial	Transportation	Total
1994	130.1	116.8	154.1	157.7	558.7
1995	133.0	120.1	159.6	167.6	580.3

Consumption by Fuel Type by Sector, 1995

(Trillion Btu – Pages 12, 13, 14, 15 and 16)

Fuel Type	Residential	Commercial	Industrial	Transportation	Electric Utilities
Coal	0.1	0.1	6.6	-	172.7
Natural Gas	44.1	39.2	43.9	3.3	3.1
Petroleum	4.8	1.9	47.1	164.3	.4
Nuclear Power	-	-	-	-	79.8
Hydroelectric Power	-	-	-	-	14.7
Biofuels	4.0	-	1.0	1.8	.2
Electric Sales	25.9	25.6	19.8	-	-
Net Energy	79.0	66.8	118.4	167.6	-
Electrical System Losses	54.0	53.3	41.2	-	-

Energy Expenditures

The Source for the following information is the *State Energy Price and Expenditures Report: 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. August, 1998. DOE/EIA-0376(95). Pages as noted.

Nebraska Compared to the United States

(Pages 7 – 10)

	Measurement	United States	Nebraska	Rank
Overall:				
Prices	Dollars per Million BTU	8.28	7.93	32
Expenditures	Million Dollars	515,800	3,372	35
Expenditures Per Person	Dollars	1,962	2,057	21
Motor Gasoline:				
Prices	Dollars per Million BTU	9.14	9.15	32
Expenditures	Million Dollars	136,475	92.8	37
Expenditures Per Person	Dollars	519	566	21
Petroleum:				
Prices	Dollars per Million BTU	7.23	7.91	15
Expenditures	Million Dollars	237,491	1,730	35

	Measurement	United States	Nebraska	Rank
Natural Gas:				
Prices	Dollars per Million BTU	3.81	3.89	35
Expenditures	Million Dollars	74,150	506	34
Coal:				
Prices	Dollars per Million BTU	1.37	.78	50
Expenditures	Million Dollars	26,911	139	35
Electricity:				
Prices	Dollars per Million BTU	20.30	15.82	40
Expenditures	Million Dollars	205,944	1,128	36

Total Expenditures by Fuel Type

(Million Dollars – Page 183)

Year	Petroleum	Natural Gas	Coal	Nuclear Fuel	Biofuels	Electric Primary Total	Utility Fuel	Electricity Purchased By End-Users	Total
1994	1,676.5	509.1	128.8	49.1	4.8	2368.3	-172.9	1,090.5	3,232.0
1995	1,729.6	506.1	139.2	54.3	5.3	2,434.5	-190.2	1,127.9	3,372.2

Expenditures by End-Use Sector

(Million Dollars – Pages 184-188)

Year	Residential	Commercial	Industrial	Transportation	Utilities Electric	Total
1994	724.3	593.3	619.7	1,348.6	172.9	3,285.9
1995	738.9	591.3	615.0	1,427.0	190.2	3,372.2

Expenditures by Fuel Type and Consuming Sector, 1995

(Million Nominal Dollars – Pages 184-188)

Fuel Type	Residential	Commercial	Industrial	Transportation	Electric Utilities	Total Expenditures
Coal	0.2	.2	9.7	-	129.2	139.3
Natural Gas	217.6	158.6	124.9	< 0.05	5.1	506.2
Petroleum	32.5	11.6	256.9	1,429.0	1.5	1,729.5
Biofuels	4.5	-	.6	-	.1	5.2
Nuclear Power	-	-	-	-	54.3	54.3
Other	-	-	-	-	0.1	0.1
Total Primary	254.8	170.4	392.1	1427.0	190.2	2,434.5
Less Utility	-	-	-	-	-190.2	-190.2
Electric Expenditures	484.1	120.9	222.9	-	-	1,127.9
Total Expenditures	738.9	591.3	615.0	1,427.0	-	3,372.2

Consumption, Prices and Expenditures by End-Use Sector

This section contains information on energy consumption, prices and expenditures for the residential, commercial, industrial, transportation and electric utility sectors. For the residential, commercial, and industrial sectors, a net total (less electrical system losses) is provided to indicate the energy actually consumed by these sectors. In addition, energy consumed in the generation, transmission, and distribution of electricity is allocated to each sector based on the electricity consumed by the sector. Thus, total consumption represents the energy consumed by the sector as well as that used to provide electricity to the sector.

Residential

The residential sector is considered to consist of all private residences, whether occupied or vacant owned or rented, including single-family homes, multifamily housing units and mobile homes. Secondary homes, such as summer homes, are also included. Institutional housing, such as school dormitories, hospitals and military barracks, generally are not included in the residential sectors but are included in the commercial sector. Energy is consumed by the residential sector is primarily for space heating, water heating, air conditioning, refrigeration, cooking, clothes drying and lighting. Fuel used for motor vehicles by household members is included in the transportation sector.

Consumption

(Trillion Btu)

Year	Coal	Natural Gas	Heating Oil	Kerosene	Propane	Electricity	Net Energy	Electric System Losses	Total Energy
1994	0.1	43.7	0.9	< 0.05	4.0	25.2	77.5	52.5	130.1
1995	0.1	44.1	0.6	< 0.05	4.2	25.9	79.0	54.0	133.0

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Page 192.

Prices

(Dollars/Million Btu)

Year	Coal	Natural Gas	Heating Oil	Kerosene	Propane	Biofuels	Electricity	Average
1994	2.47	5.09	5.56	6.84	6.78	3.56	18.48	9.34
1995	2.44	4.93	5.92	7.28	6.84	3.56	18.68	9.35

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 184.

Expenditures

(Million Dollars)

Year	Coal	Natural Gas	Heating Oil	Kerosene	Propane	Biofuels	Electricity	Total
1994	0.1	222.4	5.2	0.2	26.9	4.1	465.4	724.3
1995	0.2	217.6	3.3	0.2	29.1	4.5	484.1	738.9

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 184.

Commercial

The commercial sector, as defined economically, consists of business establishments that are not engaged in transportation or in manufacturing or other types of industrial activity (agriculture, mining or construction). Commercial establishments include hotels, motels, restaurants, wholesale businesses, retail stores, laundries, and other service enterprises; religious and nonprofit organizations; health, social and educational institutions; and federal, state, and local governments. Street lights, pumps, bridges, and public services are included if the establishment operating them is considered commercial. Fuel used in motor vehicles for commercial purposes is included in the transportation sector. Common uses of energy in the commercial sector include space heating, water heating, refrigeration, air conditioning and cooking.

Consumption

(Trillion Btu)

Year	Coal	Natural Gas	Petroleum	Electricity	Net Energy	Electric System Losses	Total
1994	0.1	8.4	3.1	24.4	65.9	50.9	116.8
1995	0.1	39.2	1.9	25.6	66.8	53.3	120.1

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Page 193.

Prices

(Dollars/Million Btu)

Year	Coal	Natural Gas	Petroleum	Electricity	Total
1994	1.52	4.30	5.26	16.88	9.00
1995	1.52	4.04	6.11	16.46	8.85

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 185.

Expenditures

(Million Dollars)

Year	Coal	Natural Gas	Petroleum	Electricity	Total
1994	0.2	165.1	16.1	411.8	593.3
1995	0.2	158.3	11.6	420.9	591.3

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 185.

Industrial

The industrial sector consists of manufacturing industries, which make up the largest part of the sector, along with mining, construction, agriculture, fisheries and forestry. Establishments in this sector range from steel mills to small farms to companies assembling electronic components. Energy used by this sector to transport products to market or inputs to the organizations is included in the transportation sector.

Consumption

(Trillion Btu)

Year	Coal	Natural Gas	Petroleum	Biofuels	Electricity	Net Total	Electric System Losses	Total
1994	7.9	36.5	53.0	1.0	18.2	116.6	38.0	154.6
1995	6.6	43.9	47.1	1.0	19.8	118.4	41.2	159.6

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Page 194.

Prices

(Dollars/Million Btu)

Year	Coal	Natural Gas	Petroleum	Biofuels	Electricity	Total Energy
1994	1.52	3.17	5.26	1.89	11.70	5.35
1995	1.48	2.85	5.45	1.89	11.26	5.23

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 186.

Expenditures

(Million Dollars)

Year	Coal	Natural Gas	Petroleum	Biofuels	Electricity	Total Energy
1994	12.7	115.3	278.4	0.6	213.3	619.7
1995	9.7	124.9	256.9	0.6	222.9	615.0

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 186.

Transportation

The transportation sector consists of private and public vehicles that move people and commodities. Included are automobiles, trucks, buses, motorcycles, railroads and railways (including streetcars), aircraft, ships, barges and natural gas pipelines. Natural gas use reflects the fuel needed to move natural gas through pipelines to end users in the residential, commercial, industrial and electric utility sectors.

Consumption

(Trillion Btu)

Year	Natural Gas	Aviation Gasoline	Diesel Fuel	Jet Fuel	Propane	Lubricants	Motor Gasoline	Total Petroleum	Biofuels	Total
1994	3.2	0.4	53.8	7.0	0.3	2.1	90.8	154.4	1.4	157.7
1995	3.3	0.4	58.8	5.7	0.4	2.1	97.3	164.3	1.8	167.3

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Page 195.

Prices

(Dollars/Million Btu)

Year	Natural Gas	Aviation Fuel	Diesel Fuel	Jet Fuel	Propane	Lubricants	Motor Gasoline	Total Petroleum	Total Energy
1994	4.74	7.96	8.21	3.99	9.11	19.11	9.17	8.73	8.73
1995	3.97	8.36	7.99	4.01	9.46	19.40	9.15	8.69	8.69

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 187.

Expenditures

(Million Dollars)

Year	Natural Gas	Aviation Fuel	Diesel Fuel	Jet Fuel	Propane	Lubricants	Motor Gasoline	Total Petroleum	Total Energy
1994	< 0.05	3.0	441.7	28.1	2.4	40.1	833.3	1,348.6	1,348.6
1995	< 0.05	3.2	469.8	22.7	0.8	40.0	890.5	1,427.0	1,427.0

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 187.

Electric Utility

The electric utility sector consists of facilities which generate electricity primarily for use by the public and meet the definition of an electric utility. Non-utility power produces are not included in the electric utility sector. Energy is used for the generation, distribution and transmission of electric power.

Energy Input at Electric Utilities

(Trillion Btu)

Year	Coal	Natural Gas	Petroleum	Nuclear Fuel	Hydro Power	Biofuels	Total
1994	152.2	3.0	0.3	67.7	13.5	0.4	236.8
1995	172.7	3.1	0.4	79.8	14.7	0.2	270.8

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Page 196.

Price Input by Source

(Dollars/Million Btu)

Year	Coal	Natural Gas	Petroleum	Nuclear Fuel	Biofuels	Total
1994	0.77	2.05	3.98	0.73	0.86	0.77
1995	0.75	1.66	4.15	0.68	0.77	0.74

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 188.

Expenditures

(Million Dollars)

Year	Coal	Natural Gas	Petroleum	Nuclear Fuel	Biofuels	Total
1994	116.4	6.2	1.1	49.1	0.1	172.9
1995	129.2	5.1	1.5	54.3	0.1	190.2

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 188.

Resources Statistics

Natural Gas

Consumption by Sector

(Billion Cubic Feet)

Year	Residential	Commercial	Industrial	Transportation	Electric Utility
1994	44	39	37	3	3
1995	45	40	45	3	3

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Page 192.

Prices by Sector

(Dollars/Thousand Cubic Feet)

Year	Residential	Commercial	Industrial	Transportation	Electric Utility
1994	5.09	4.30	3.17	4.74	2.05
1995	4.93	4.04	2.85	3.97	1.66

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Pages 184, 185, 186 and 188.

Expenditures by Sector

(Million Dollars)

Year	Residential	Commercial	Industrial	Transportation	Electric Utility
1994	222.4	165.1	115.3	<0.05	6.2
1995	217.6	158.6	124.9	<0.05	5.1

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Pages 184, 185, 186 and 188.

Deliveries to Residential Consumers

(Million Cubic Feet)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
1994	8,455	8,562	6,098	4,020	2,328	1,179	1,014	935	1,037	1,523	3,169	6,076	44,396
1995	7,943	6,978	5,876	4,177	2,893	1,548	1,010	883	1,032	1,537	4,029	6,034	43,939

Source: *Natural Gas Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C.

Prices to Residential Consumers

(Dollars/Thousand Cubic Feet)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Ave.
1994	4.86	4.72	4.97	5.09	5.39	6.10	6.32	6.54	6.26	5.60	4.85	4.57	5.01
1995	4.51	4.45	4.45	4.71	5.09	5.94	6.35	6.59	6.32	5.84	4.96	4.74	4.83

Source: *Natural Gas Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. Monthly.

Deliveries to Commercial Consumers

(Million Cubic Feet)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
1994	5,471	5,456	4,090	2,741	1,934	2,284	2,501	3,614	1,834	2,240	2,606	4,174	38,945
1995	5,286	4,799	6,061	2,985	2,374	1,753	3,868	4,744	NA	NA	NA	NA	40,044

Source: *Natural Gas Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. Monthly.

Prices to Commercial Consumers

(Dollars/Thousand Cubic Feet)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Ave.
1994	4.48	4.36	4.52	4.55	5.34	3.80	3.72	3.69	3.79	4.04	3.95	4.07	4.24
1995	4.08	3.97	3.97	3.90	5.00	3.77	3.64	3.63	NA	NA	NA	NA	3.96

Source: *Natural Gas Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. Monthly.

Natural Gas Deliveries to Industrial Consumers

(Million Cubic Feet)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
1994	3,062	2,867	3,400	3,314	2,666	2,995	2,975	2,765	2,895	2,712	3,447	3,862	36,960
1995	3,632	3,231	3,434	3,283	3,214	2,960	4,055	3,524	3,150	2,810	3,744	2,894	39,932

Source: *Natural Gas Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. January, 1996. Pages 37-39. March, 1996. Pages 36-38.

Natural Gas Prices to Industrial Consumers

(Dollars/Thousand Cubic Feet)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Ave.
1994	3.56	3.61	3.68	3.17	3.07	2.75	2.78	2.69	2.71	2.53	2.81	2.95	3.12
1995	2.95	2.89	2.90	2.67	2.67	2.58	2.63	2.90	2.74	2.49	2.32	2.85	2.73

Source: *Natural Gas Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. January, 1996. Pages 58-59. March, 1996. Pages 57-58.

Natural Gas Deliveries to Electric Utilities

(Million Cubic Feet)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
1994	94	49	204	553	413	741	235	155	168	159	152	139	3,062
1995	85	68	205	134	113	211	483	782	198	246	269	265	3,059

Source: *Natural Gas Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. January, 1996. Pages 41-43. March, 1996. Pages 40-42.

Natural Gas Prices to Electric Utilities

(Dollars/Thousand Cubic Feet)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Ave.
1994	3.11	3.14	2.58	2.10	1.93	1.86	2.12	2.11	2.03	1.51	1.86	1.93	2.02
1995	2.09	1.90	1.90	1.60	1.94	1.96	1.50	1.54	1.58	1.50	1.67	1.91	1.65

Source: *Natural Gas Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. January, 1996. Pages 61-62. March, 1996. Pages 60-61. July, 1996. Page 61

Natural Gas Deliveries to All Consumers

(Million Cubic Feet)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
1994	17,082	16,935	13,792	10,627	7,342	7,200	6,726	7,468	5,934	6,634	9,374	14,251	123,365
1995	16,946	15,076	13,577	10,579	8,594	6,472	9,415	9,933	9,817	10,925	18,971	23,892	154,198

Source: *Natural Gas Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. January, 1996. Pages 45-47. March, 1996. Pages 44-45. July, 1996. Page 46.

Average City Gate Price of Natural Gas

(Dollars/Thousand Cubic Feet)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Ave.
1994	2.73	2.92	3.17	2.95	3.94	3.85	3.38	3.50	3.28	3.22	2.65	2.38	2.98
1995	2.38	2.20	2.47	2.18	2.68	2.69	3.42	3.11	2.97	2.80	2.43	2.34	2.49

Source: *Natural Gas Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. March, 1996. Pages 48-49.

Summary Statistics for Natural Gas, 1994-1995

	1994	1995
Number of Consumers:		
Residential	428,201	427,720
Commercial	62,045	61,275
Industrial	766	2,432
Average Annual Consumption per Consumer:		
(Thousand Cubic Feet)		
Residential	104	105
Commercial	628	654
Industrial	48,251	18,407
Average Prices for Natural Gas:		
(Dollars per Thousand Cubic Feet)		
Wellhead (Marketed Production)	1.60	1.19
Pipeline Fuel	1.34	1.33
City Gate		
Delivered to Consumers:		
Residential	5.01	4.83
Commercial	4.24	3.96
Industrial	3.12	2.79
Vehicle Fuel	4.67	-
Electric Utilities	2.02	1.65

Deliveries to Consumers: (Million Cubic Feet)	**1995**	**Percent of National Total**
Residential	45,054	0.93
Commercial	40,044	1.32
Industrial	44,767	0.52
Electric Utilities	3,059	0.10
Total	132,923	0.68

Source: *Natural Gas Annual 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. November, 1996. DOE/EIA-0131(95). Pages 148-149.

Petroleum

Consumption by Product

(Thousand Barrels)

Year	Motor Gasoline	Distillate Fuel	Jet Fuel	Aviation Gasoline	Kerosene	Propane	Residual Fuel	Other	Total
1994	18,050	15,692	1,259	76	21	3,080	215	1,449	39,841
1995	19,302	15,588	1,001	77	17	3,020	123	1,340	40,436

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Page 191.
NOTE: Other includes asphalt, road oil, lubricants, and other specialty products.

Consumption by Sector

(Thousand Barrels)

Year	Residential	Commercial	Industrial	Transportation	Electric Utilities	Total
1994	1,256	600	9,653	28,287	45	39,841
1995	1,272	408	8,638	30,056	61	40,435

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Pages 192-196.

Expenditures

(Million Dollars)

Year	Motor Gasoline	Distillate Fuel	Jet Fuel	Propane	Residual Fuel	Other	Total
1994	869.7	623.6	28.1	79.7	2.8	72.6	1,676.5
1995	928.0	624.4	22.7	79.9	1.8	72.7	1,729.6

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Page 183.
NOTE: Other includes asphalt, road oil, aviation gasoline, kerosene, lubricants and other specialty products.

Expenditures on Petroleum Products by Sector

(Million Dollars)

Year	Residential	Commercial	Industrial	Transportation	Electric Utilities	Total
1994	32.3	16.1	278.4	1,348.6	1.1	1,676.5
1995	32.5	11.6	256.9	1,427.0	1.5	1,729.5

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Pages 184-188.

Electricity

Consumption and Expenditures by Sector

	Consumption (Million Kilowatthours)				Expenditures (Million Dollars)			
Year	Residential	Commercial	Industrial	Total	Residential	Commercial	Industrial	Total
1994	7,379	7,149	5,345	19,873	465.4	411.8	213.3	1,090.5
1995	7,597	7,494	5,802	20,893	484.1	420.9	222.9	1,127.9

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Pages 192-194. *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Pages 184-186.

Utility Retail Sales to Ultimate Consumers by Sectors

(Million Kilowatthours, January – December, 1994 and 1995)

Sector	1994	1995
Residential	7,464	7,714
Commercial	5,784	5,957
Industrial	5,317	5,723
Others	1,333	1,501
All Sectors	19,898	20,895

Source: *Electrical Power Monthly.* Energy Information Administration. March, 1996. Page 70.

Coal

Consumption by Sector

(Thousand Short Tons)

Year	Residential	Commercial	Industrial	Transportation	Electric Utilities	Total
1994	2	5	414	0	8,879	9,300
1995	3	6	339	0	10,048	10,396

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Pages 192-196.

Prices by Sector

(Dollars/Million Btu)

Year	Residential	Commercial	Industrial	Electric Utilities
1994	2.47	1.52	1.52	.77
1995	2.44	1.8	1.48	.75

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Pages 184-188.

Expenditures by End-Use Sector

(Million Dollars)

Year	Residential	Commercial	Industrial	Transportation	Electric Utilities	Total
1994	0.1	0.2	12.0	0.0	116.4	128.7
1995	0.2	0.2	9.7	0.0	129.2	139.3

Source: *State Energy Price and Expenditure Report, 1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0376(95). Pages 184-188.

Crude Oil and Natural Gas Production

Crude Oil Production

Crude Oil Production, Wellhead Price, Producing Wells and Proven Reserves

Year	Production (Thousand Barrels)	Wellhead Price (Dollars per Barrel)	Producing Wells (As of December 31)	Proven Reserves (Million Barrels)
1994	4,217	13.60	1,489	22.0
1995	3,793	15.73	1446	22.0

Sources: *Nebraska Oil Activity Summary, Annual Report.* Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska. Annual. *Petroleum Marketing Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. Monthly. *U.S. Crude Oil, Natural Gas and Natural Gas Liquids Reserves: 1994 Annual Report.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. October, 1995.

Crude Oil Production

(Thousand Barrels)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
1994	377.4	335.2	368.9	330.1	365.5	346.8	357.9	355.2	346.1	351.9	337.2	345.0	4,217.1
1995	339.1	308.4	334.3	320.6	322.4	309.9	308.8	317.7	307.6	314.3	302.2	307.3	3,792.6

Source: *Nebraska Oil Activity Monthly Summary.* Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska. Monthly.

Production of Crude Oil by County

(Thousand Barrels)

Year	Banner	Chase	Cheyenne	Dundy	Frontier	Furnas	Garden	Harlan	Hayes
1994	308.5	1.8	682.8	101.5	54.7	20.0	1.1	12.4	119.5
1995	283.1	1.8	599.9	108.9	48.6	19.7	4.9	12.8	102.4

Year	Hitchcock	Kimball	Lincoln	Morrill	Red Willow	Richardson	Scottsbluff	Sioux	Total
1994	1,170.8	911.8	1.6	135.6	574.8	42.1	77.3	0.0	4,216.3
1995	1,069.8	800.9	2.8	120.6	525.8	29.2	61.7	0.0	3,793.8

Source: *Nebraska Oil Activity Annual Summary.* Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska. Annual.

Natural Gas Production

Production of Natural Gas, Wellhead Price, Producing Wells and Proven Reserves

Year	Production (Million Cubic Feet)	Wellhead Price (Cents/Thousand Cubic Feet)	Producing Wells (As of December 31)	Proven Reserves (Billion Cubic Feet)
1994	2,093	160.0	76	67.0
1995	1,557	119.0	79	NA

Sources: *Nebraska Oil Activity Summary, Annual Report.* Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska. Annual. *Natural Gas Annual 1994, Volume 1.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. November, 1995. *U.S. Crude Oil, Natural Gas and Natural Gas Liquids Reserves: 1994 Annual Report.* Energy Information Administration, U.D. Department of Energy. Washington, D.C. October, 1995.

NOTE: Nebraska reserves are included with a group of states, including Arizona, Illinois, Indiana, Iowa, Maryland, Minnesota, Missouri, Oregon, South Dakota, Tennessee, Virginia and Washington.

NA: Information not available

Natural Gas Production by County

(Million Cubic Feet)

Year	Cheyenne	Deuel	Dundy	Garden	Kimball	Total
1994	2,078.5	0.0	0.0	0.0	14.7	2,093.2
1995	1,509.8	0.5	0.5	38.2	8.9	1,557.9

Source: *Nebraska Oil Activity Annual Summary.* Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska. Annual.

Well Drilling

There were 36 drilling permits issued in 1994 for exploratory wells, a decrease of 33.3% from the 54 permits in 1993. Thirty permits were issued for development wells in 1994, a 56.5% decrease from the 69 issued in 1993.

Exploratory Well Permits Issued

(Number of Permits)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
1994	2	2	4	1	4	1	2	3	5	4	2	6	36
1995	0	1	1	2	7	0	0	5	1	4	1	2	24

Source: *Nebraska Oil Activity Monthly Summary.* Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska. Monthly.

Development Well Permits Issued

(Number of Permits)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
1994	2	5	3	0	1	3	4	1	1	1	0	9	30
1995	3	2	1	0	5	2	5	2	1	3	3	1	28

Source: *Nebraska Oil Activity Monthly Summary.* Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska. Monthly.

Stripper Wells, Stripper Wells Abandoned, Stripper Well Production and Percentage of Total Crude Oil Production

Year	Stripper Wells	Stripper Wells Abandoned	Stripper Well Production (Thousand Barrels)	Percent of Total Crude Oil Production
1994	1,274	65	2,214.6	45.5
1995	1,114	36	1,899.0	50.1

Source: Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska.

Ethanol Production

Ethanol Fuel Available for Sale and Market Share

Year	Gasohol Available for Sale (Thousand Gallons)	Market Share (Percentage)
1994	223,097	29.5
1995	230,812	28.6

Source: *Monthly Motor Fuel Consumption.* Nebraska Department of Roads. Monthly.

Electric Generation and Retail Sales

Electric Utility Net Generation by Fuel Type

(Million Kilowatthours)

	1994	1995
Coal	14,002	16.080
Petroleum	18	27
Natural Gas	259	245
Hydroelectric	1,312	1,426
Nuclear	6,345	7,485
Other	9	16

Source: *Electric Power Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. March, 1996. Pages 16, 17, 20, 23-25.

Retail Sales to Ultimate Consumers by Sector

(Million Kilowatthours, January –December)

Year	Residential	Commercial	Industrial	Other	Total
1994	7,464	7,784	5,317	1,333	19,898
1995	7,714	5,957	5,723	1,501	20,894

Source: *Electric Power Monthly.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. March, 1996. Page 70.

Hydro Power Generation

(Megawatthours)

Plant	1994	1995
Central Nebraska Public Power and Irrigation District		
Jeffrey Canyon	84,379	105,307
Johnson No. 1	54,187	76,755
Johnson No. 2	65,809	97,340
Kingsley	111,379	98,330
Nebraska Public Power District		
Columbus	106,668	116,103
Kearney	17	10
Minnechaduza	0	0
Monroe	21,536	23,474
North Platte	86,977	126,358
Spencer	12,390	13,347
Spalding	38	0
U.S. Corps of Engineers		
Gavins Point	768,503	769,034
Total	1,311,883	1,426,058

Source: *Electric Power Monthly*. Energy Information Administration, U.S. Department of Energy. Washington, D.C. Monthly.

Coal Plant Generation

(Megawatthours)

Plant	1994	1995
Fremont	300,854	307,315
Grand Island		426,278
Hastings	427,149	409,031
Nebraska Public Power District		
Gentleman	6,754,637	808,325
Sheldon	1,285,150	1,300,885
Omaha Public Power District		
Nebraska City	2,630,509	3,412,970
North Omaha	2,084,177	2,214,715
Nebraska Total	14,002,015	16,079,519
Lincoln Electric System		
Laramie River(1)	1,220,897	1,070,829

Source: *Electric Power Monthly*. Energy Information Administration, U.S. Department of Energy. Washington, D.C. Monthly.
NOTE: (1) Lincoln Electric System ownership share of Laramie River plant in Wyoming

Miscellaneous Statistics

Total Population

Thousands)

Year	Population
1994	1,624
1995	1,637

Source: *Statistical Abstract of the United States, 1995.* Bureau of the Census, U.S. Department of Commerce. Washington, D.C. Annual.

Irrigation Wells Registered and Acres Irrigated

Year	Acres Irrigated
1994	8,100,000
1995	8,100,000

Source: *Nebraska Agricultural Statistics.* Nebraska Department of Agriculture. Lincoln, Nebraska. Annual.

Consumer Price Index: All Items, Fuel and Other Utilities, Motor Fuel and Energy

(1982-84 = 100)

Year	All Items	Fuel and Other Utilities	Motor Fuel	Energy
1994	148.2	122.8	98.5	104.6
1995	152.4	123.2	99.9	104.7

Source: *Consumer Price Index.* Bureau of Labor Statistics.

Other Information

Approximate Heat Content of Petroleum Products

Product	Million Btu per Barrel	Btu per Gallon
Aviation Gasoline	5.048	120,190
Crude Oil	5.800	138,095
Distillate Fuel Oil	5.825	138,690
Jet Fuel, Kerosene Type	5.670	135,000
Kerosene	5.670	135,000
Lubricants	6.065	144,405
Motor Gasoline	5.253	125,071
Propane	3.836	91,333
Residual Fuel Oil	6.287	149,690

Source: *State Energy Data Report, Consumption Estimates, 1960-1994.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. Oct., 1996.

Approximate Heat Rates for Electricity

(Btu/Kilowatthour)

Year	Consumption	Fossil Fuel Steam-Electric Power Plant Generation	Nuclear Power Plant Generation
1994	3,412	10,272	10,676
1995	3,412	10,272	10,676

Source: *State Energy Data Book, Consumption Estimates, 1960-1994.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. Oct., 1996. 1995 Preliminary Estimates. Nebraska Energy Office.

NOTES: The heat content of a kilowatthour of electricity for consumption is 3,412 Btu regardless of the generation process. The heat content for a fossil fuel steam-electric power plant is assumed to be the average at all such U.S. power plants. This factor is also applied to convert hydroelectricity for distribution.

Approximate Heat Content of Natural Gas and Coal Consumed

Natural Gas (Thousand Btu/Cubic Foot)			Coal (Million Btu/Short Ton)		
Year	Utility	Non-Utility	Residential Commercial	Industrial	Electric Utility
1994	0.987	0.985	21.888	19.098	17.141
1995	0.988	0.980	20.321	19.359	17.188

Source: *State Energy Data Report, Consumption Estimates, 1960-1995.* Energy Information Administration, U.S. Department of Energy. Washington, D.C. December, 1997. DOE/EIA-0214(95). Pages 485, 487, 491, 493 and 495.

Degree Days

Heating Degree Days (HDD) are used to estimate the amount of energy required for residential space heating during the cool season. To calculate the HDDs you must first find the mean temperature for the day. This is usually done by taking the high and low temperature for the day, adding them together and dividing by two. If the mean temperature is at or above 65F, then the HDD amount is zero. If the mean temperature is below 65F, then the HDD amount equals 65 minus the mean temperature. For example, if the mean temperature was 55F then the HDD amount equals 10.

Cooling Degree Days (CDD) are used to estimate the amount of air conditioning usage during the warm season. To calculate CDDs, you must first find the mean temperature for the day. This is usually done by taking the high and low temperature for the day, adding them together and diving by two. If the mean temperature is at or below 65F, then the CDD value is zero. If the mean temperature is above 65F, then the CDD amount equals the mean temperature minus 65. For example, if the mean temperature was 75F then the CDD amount equals 10. You can thinking of cooling degree days a the flip side to heating degree days.

For example, the following table displays historical heating degree days weighted by population. Using the 1990 census, these data are weighted by population to account for differences between more and less populous areas of Nebraska. This produces values that can be used to assess Nebraska's climate.

Heating Degree Days Weighted by Population

Nebraska, Monthly 1993-1997

Year	J	F	M	A	M	J	J	A	S	O	N	D	Total
1993	1,458	1,267	922	548	217	62	15	15	202	449	944	1,083	7,182
1994	1,390	1,241	731	457	139	18	21	19	83	343	751	1,131	6,324
1995	1,284	894	833	571	324	45	3	1	135	412	889	1,149	6,540
1996	1,432	994	1,030	490	248	26	17	21	148	379	1,013	1,329	7,126
1997	1,386	1,001	743	616	281	26	6	19	78	371	888	1,098	6,513
Normal	1,332	1,042	824	446	195	33	10	14	112	405	849	1,205	6,467

Sources: *State, Regional, and National Monthly and Seasonal Heating Degree Days: Weighted by Populations* NOAA and *Monthly State, Regional, and National Heating Degree Days Weighted by Population.* NOAA.

Heating and Cooling Degree Day information for specific Nebraska locations is available by contacting the Nebraska Energy Office.

Conversion Factors

A conversion factor is a number that translates units of one system of measure into corresponding units of another. Conversion factors can be used to translate physical units of measure for various fuels into British Thermal Unit (Btu) equivalents. This is useful to assess how much heat can be generated from a given amount of an energy source such as coal, propane or kerosene. Other conversion factors are used to change from one unit of measure to another.

The following examples illustrate conversions:

- One barrel of crude oil is equivalent to 42 U.S. gallons. To find out how many gallons are in 100 barrels of crude oil simply multiply the number of barrels by the conversion factor, 42, to obtain 4,200.
- How many Btu are in 150 gallons of propane? Looking at table below there are 135,000 Btu per barrel of kerosene. Multiply 150 gallons of propane by 135,000 Btu per gallon for the answer of 20,250,000 Btu.
- Convert the number of gallons (150) by how many barrels are in a gallon (42). Then multiply that figure by the conversion factor based on barrels which is 5.670 million Btu. Keep in mind the difference in significant figures between conversion factors (e.g., 20.25 million Btu is the same as 20,250,000).

TO CONVERT FROM	TO	MULTIPLY BY
Barrels (oil)	Gallons (oil)	42
Btu	Joules	1054.8
Btu	Kilogram-calories	0.252
Btu	Kilowatt-hrs	0.0002928
Btu/hr	Watts	0.2931
Btu/min	Horsepower	0.02356
Calorie	Kilowatt-hour	$1.16x10^{e-06}$
Foot-candle	Lumen/sq. meter	10.764

TO CONVERT FROM	TO	MULTIPLY BY
Gallons (oil)	Barrels (oil)	.02380952
Horsepower	Kilowatts	0.7457
Horsepower	Watts	745.7
Joules	Btu	$9.48x10^{e-04}$
Kilogram-calories	Btu	3.968
Kilowatts	Horsepower	1.341
Kilowatts	Watts	1000
Kilowatt-hrs	Btu	3413
Lumen	Spherical candle power	0.07958
Therm	Btu	100,000
Tons (metric)	Pounds	2204.62
Tons (long)	Pounds	2240
Tons (short)	Pounds	2000
Watts	Horsepower	.00134
Watts	Kilowatts	0.001
Watt-hours	Horsepower-hrs	.00134

Source: Various, including *State Energy Data Report: Consumption Estimates*. EIA.

Glossary Of Energy-Related Terms

Aviation Gasoline: All special grades of gasoline for use in aviation reciprocating engines.

Barrel: A volumetric unit of measure for crude oil and petroleum products equivalent to 42 U.S. gallons.

British Thermal Unit (Btu): A unit of heat energy. The amount of energy required to raise the temperature of one pound of water 1 degree Fahrenheit. An average BTU content of fuel is a heat value per unit of quantity as determined from tests of fuel samples.

City Gate Price: Price of natural gas at the point it is transferred from a pipeline to a local distribution company.

Coal: A black or brownish-black solid combustible substance formed by the partial decomposition of vegetable matter without access to air. Coal supplies are generally measured in metric tons.

Commercial Sector: Non-manufacturing business establishments, including hotels, motels, restaurants, wholesale businesses, retail stores, laundries and other service related enterprises; health, social, and education institutions; and federal, state, and local governments. Street lights, pumps, bridges and public services are also included.

Conversion Factor: A number that translates units of one system of measure into corresponding values of another system of measure.

Crude Oil: A mixture of hydrocarbons that exists in liquid phase in underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities.

Daily Average Temperature: The average of the maximum and minimum temperatures in a 24-hour period.

Degree Days, Cooling: The number of degrees that the daily average temperature is above 65 degrees Fahrenheit.

Degree Days, Heating: The number of degrees that the daily average temperature is below 65 degrees Fahrenheit.

Degree Days, Normal: The simple arithmetic average of monthly or annual degree days over a long period of time (usually the thirty-year period 1951-1980).

Developmental Well: A well drilled within the proven area of an oil or a gas reservoir to the depth of a stratigraphic horizon known to be productive.

Diesel Fuel: See Distillate Fuel.

Distillate Fuel: Light fuel oils distilled during the refining process and used primarily for space heating, on- and off-highway diesel engine fuel (e.g., railroad engines and agricultural machinery) and electric power generation.

Electrical System Energy Losses: The amount of energy lost during generation, transmission, and distribution of electricity (including electricity used by the generating plant).

Electric Utility Sector: Privately and publicly owned facilities for the generation, transmission, distribution, or sale of electric energy.

End Use Energy: A measure of the energy content of fuels at the point where they are consumed. End use energy does not include energy lost during the generation and transmission of electricity.

Energy: The ability to do work.

Exploratory Well: A well drilled to find and produce oil or gas in an unproven area; to find a new reservoir in a field previously found to be productive; or to extend the limit of a known reservoir.

F.O.B. Price (Free on Board): The price actually charged at the point of loading.

Gasohol: A blend of at most 90 percent finished motor gasoline and at least 10 ethanol. This term has largely been replaced by the name "super unleaded with Ethanol".

Gasoline: A complex mixture of relatively volatile hydrocarbons, with or without additives, that have been blended to form a fuel suitable for use in internal combustion engines.

Heating Oil: A distillate fuel oil for use in atomizing-type burners for domestic heating or for moderate capacity commercial and industrial burner units.

Hydroelectric Power: Electricity generated by an electric power plant that relies on falling water to turn turbines.

Industrial Sector: Manufacturing, construction, mining, agricultural, fishing and forestry establishments.

Jet Fuel: Includes both naphtha-type and kerosene-type jet fuel.

Kerosene: A petroleum middle distillate used primarily in space heaters, cooking stoves, and water heaters.

Kilowatt (Kwkw): One thousand watts. (See Watt.)

Kilowatt-hour (kWh): One thousand watt-hours. (See Watt-hour.)

Megawatt: One million watts; one thousand kilowatts (See Watt).

Middle Distillates: A General class of fuels that includes heating oil, diesel fuel, and kerosene.

Motor Gasoline: Motor gasoline includes both leaded and unleaded grades of finished motor gasoline, reformulated motor gasoline, oxygenated motor gasoline, other finished motor gasoline, blending components and gasohol.

Natural Gas: A mixture of hydrocarbons and small quantities of other substances existing in a gaseous phase or in solution with crude oil in natural underground reservoirs.

Net Interstate Sales of Electricity: The difference between the amount of electricity sales and electricity losses (due to generation an transmission) within Nebraska and the total amount of energy used in generating electricity within the state.

Nuclear Power: Electricity generated by an electric power plant with turbines that are driven by steam produced in a reactor by heat produced from the fission of nuclear fuel.

Petroleum: A generic term that refers to oil and oil products in all forms, e.g., crude oil, unfinished oils, etc. Petroleum is generally measured in gallons or barrels.

Power: The rate at which energy is produced, used or converted from one form to another.

Primary Energy: A measure of the energy content of resources consumed including the energy lost during the production and transmission of electricity.

Primary Energy Resources: Petroleum, natural gas, coal, hydro-electric power, and nuclear power.

Propane: A normally gaseous hydrocarbon extracted from natural gas or refinery gas streams. For the purposes of this statistical abstract, propane includes other liquefied petroleum gases (lpg) such as butane and ethane.

Proved Reserves: The estimated quantity of crude oil or natural gas which geological and engineering data demonstrate with a given probability to be recoverable in the future assuming current costs of operation and market prices.

Residential Sector: Private households which consume energy primarily for heating, water heating, air conditioning, lighting, refrigeration, and cooking.

Residual Oil: The heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations.

Road Oil: Any heavy petroleum oil, such as residual alphaltic oil, used as a dust palliative and surface treatment on roads and highways.

Short Ton: A unit of weight equal to 2,000 pounds.

Special Fuels: Alternative fuels used in combustion engines, such as bio-diesel or liquid petroleum.

Stripper Well: Well which produce less that ten barrels of crude oil per day.

Therm: One hundred thousand Btu (See BTU). This is approximately the energy I one hundred cubic feet (Hcf or Ccf) of natural gas.

Transportation Sector: Private and public vehicles (i.e., cars, trains, buses) used for the transportation of people and goods.

Vessel Bunkering: Includes sales for the fueling of commercial or private boats, inclusive to oil company vessels but excluding military vessels.

Watt: An electrical unit of power. The rate of energy transfer equivalent to one (1) ampere flowing under a pressure of 1 volt at unity power factor.

Watt-hour (Wh): An electrical energy unit of measure equal to one (1) watt of power supplied to, or taken from, an electric circuit steadily for 1 hour.

Wellhead Price: Represents the sales price, including charges for natural gas plant liquids subsequently removed from the gas, gathering and compression charges, and State production, severance and/or similar charges.

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